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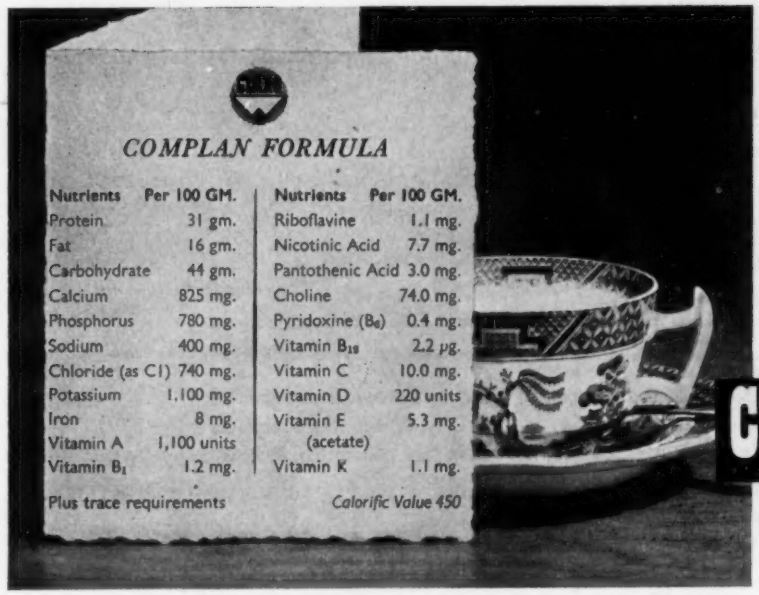


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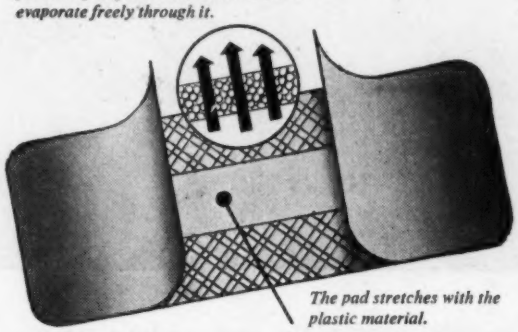

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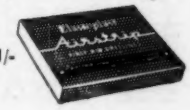

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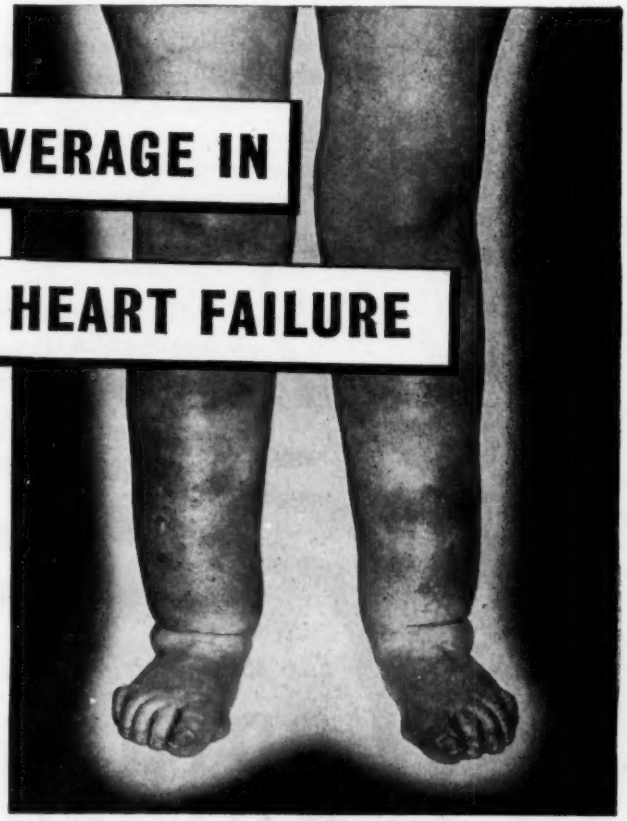

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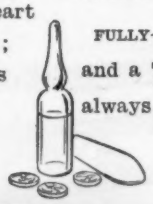

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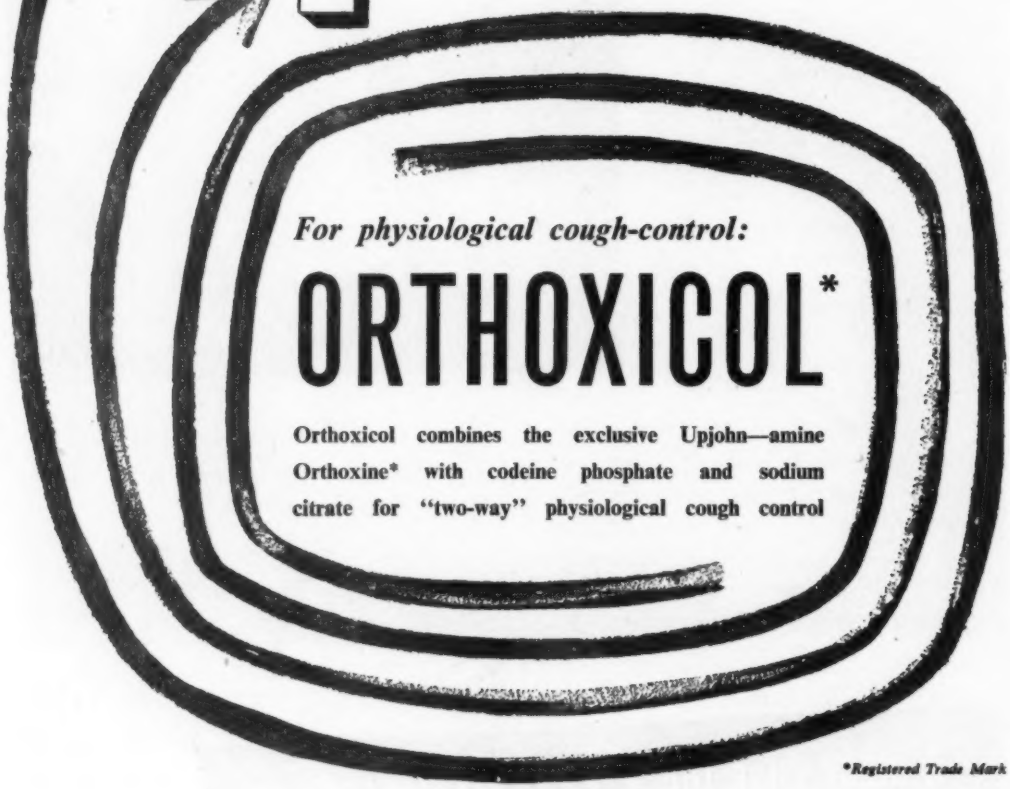

***For physiological cough-control:***

# ORTHOXICOL*

**Orthoxicol combines the exclusive Upjohn—amine Orthoxine* with codeine phosphate and sodium citrate for "two-way" physiological cough control**

*Registered Trade Mark

*Dosage:*

**Infants:** (2 to 6 months) 3 to 6 drops every four to six hours
(6 to 12 months) 6 to 10 drops every four to six hours
(1 to 2 years) 10 to 20 drops every four to six hours
**Children:** (2 to 12 years) ½ to 1 teaspoonful every four hours
**Adults:** 1 to 2 teaspoonfuls every three or four hours

*Supplied:*
in bottles of 2 and 16 ounces

Upjohn

**UPJOHN OF ENGLAND LTD**
**4 ALDFORD STREET · LONDON W1**

"You've got to give them something to rub on, old boy.
I often wonder if it isn't just the massage that relieves the pain."

*"There's been some work published on that,* comparing the effects of medicated creams with an inert control cream in soft tissue rheumatism."*

"Never saw the papers—but I bet the inert cream came out of it pretty well."

*"Not so well as you might think—and surprisingly enough, of all the so-called active principles tried, a salicylate gave the best results."*

"Counter-irritant, eh?"

*"No—a new salicylate, diethylamine salicylate, capable of free skin penetration and not irritating at all."*

"That's a new idea, isn't it? Local salicylate therapy. I always start patients off on salicylates by mouth for rheumatic pain. Useful to be able to put it through the skin at the site of the pain. What's this stuff called?"

* *British Journal of Physical Medicine* **16**, 62 (1953)

# Algesal

*10% diethylamine salicylate in a soothing vanishing cream*

**non-irritant, skin penetrating salicylate for the relief of rheumatic pain by inunction**

Full literature and samples gladly sent on request to the manufacturers:
E. G. H. LABORATORIES LTD, PERU STREET, SALFORD 3, LANCS.

relief of cough

BENYLIN EXPECTORANT* is a rational and effective preparation containing Benadryl* and expectorants for the relief of cough associated with irritative and congestive conditions of the respiratory tract. It inhibits the cough reflex, alleviates congestive symptoms, such as nasal stuffiness, and exerts a soothing effect on the upper respiratory mucosa. Benylin Expectorant is presented as a pleasant raspberry-flavoured syrup, and as it is free from opiates is suitable for children as well as adults.

**Trade Mark*

# Benylin Expectorant

**demulcent · decongestant**

Supplied in bottles of 4, 16 and 80 fl. ozs.

**Parke, Davis** & Company, Ltd. *(Inc. U.S.A.)* Hounslow, Middx. Tel: Hounslow 2361

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# in hypertension

## smooth predictable control now possible ORALLY

**ORAL CONVENIENCE WITH PARENTERAL RELIABILITY**

Smooth control of hypertension with *oral* medication is possible *only* if the drug used is readily and dependably absorbed.

'INVERSINE' alone of all available ganglionic blocking agents is *completely absorbed when given orally*. 'INVERSINE' is a secondary amine, *not* a quaternary ammonium compound. The effect of any given dosage on one patient is entirely predictable — hitherto impossible with oral hexamethonium or pentolinium compounds.

'INVERSINE' *offers these advantages:—*
*Minimal fluctuation of blood pressure • Reproducible clinical response • Gradual onset and long duration of action • Small dosage • Effective in cases resistant to hexamethonium • Tolerance infrequently encountered • Parenteral administration unnecessary*

# 'Inversine'

Trade Mark

**Mecamylamine Hydrochloride TABLETS**

*'Inversine' (Mecamylamine Hydrochloride) 10 mg. quarter-scored tablets are supplied in bottles of 100.*

MSD MERCK SHARP & DOHME LIMITED, HODDESDON, HERTS

*Literature and professional package gladly sent on request.*

# proving the potential of DIAMOX®

ACETAZOLAMIDE

## in cardiac oedema

*New Eng. J. Med.* (Feb. 3) 1949.
*New Eng. J. Med.* (July 23) 1953.
*J. Med. Soc. N. Jersey* (Nov.) 1954.
*El Dia Medico* (Feb. 14) 1955.

## in glaucoma

*Am. J. Ophthal.* (Jan. and July) 1954.
*Brit. J. Ophthal.* 39:647, 1955.
*Lancet*, 1:951, 1955.
Editorial Article, *Brit. Med. J.*, 2:479, 1955.

## in oedema of pregnancy

*Am. J. Obstet. and Gynec.*, 56:1, 1948.
*Proc. R. Soc. Med.*, 46:396, 1953.
*Lancet*, 2:1223, 1955.
*N. Carolina Med. J.*, 16:4:130, 1955.

## in epilepsy

*Neurology*, 4:863 (Nov.) 1954.
*J.A.M.A.*, 160:268, 1956.
*Lancet*, 1:304 and annotation 273, 1956.
*Brit. Med. J.*, 1:650, 1956.

DIAMOX Acetazolamide, in these and many other conditions, stands distinguished as the diuretic of proven effectiveness. So convincing is the documentary evidence, that today no practitioner will lightly disregard the potentialities of DIAMOX.

A digest of clinical evidence on DIAMOX is available to all doctors in a new Lederle book entitled "DIAMOX 1956."

**TABLETS:**
DIAMOX Acetazolamide Tablets of 250 mg. (engraved). Bottles of 25, 100 and 1,000.

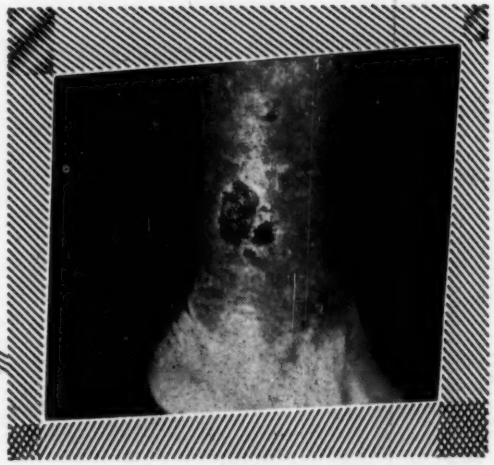
**PARENTERAL:**
DIAMOX Acetazolamide Sodium Parenteral 500 mg. Vials of 500 mg.

**Regd. Trade Mark*

**LEDERLE LABORATORIES DIVISION**
*Cyanamid* PRODUCTS LTD. **LONDON, W.C.2**

# The use of stabilized Trypsin

## A NEW TREATMENT FOR **ULCERS** **ABRASIONS** **BURNS** **PYODERMIAS**



ANY MEDICAL PRACTITIONER knows how stubbornly resistant to any therapy a long-standing varicose ulcer can be. The reason is partly the diminished blood supply, but more perhaps the formation of a pus-containing layer and of crusts which cover the ulcer and impede the healing process. Similar difficulties are often encountered in the treatment of wounds and abrasions.

### *PROTEOLYTIC ACTION*

It has long been known that the proteolytic enzyme trypsin could digest crusts by the process of physiological currettage. The difficulty has been to incorporate the trypsin in a stable preparation. In Biotrase, trypsin remains active physiologically for over one year. It rapidly dissolves crusts and scabs and leaves a clean, granulating surface. A certificate of stability has been issued by a Department of Bio-chemistry.

Biotrase has been designed by Lloyd-Hamol of London and Zurich for the treatment of infected skin lesions. Apart from trypsin, it contains two new antiseptic agents of proved bacteriolytic properties, Ca-N-Hydroxymethylglutaminate and 2,2¹ thiobis-(4,6-dichlorophenol), designated bithionol, both of which are effective against a wide range of gram-positive and gram-negative pathogenic organisms and do not cause skin sensitivity. Biotrase also contains carbamide, included for its buffering properties.

### *INDICATIONS FOR USE*

Biotrase may be used wherever there is an infected—or potentially infected—breach of surface of the skin. Common conditions for its use include the following: Varicose, diabetic and post-thrombotic ulcers; wounds, and second and third degree burns; infected and necrotic skin conditions, including pyodermias; boils and carbuncles (following incision).

**COMPOSITION OF BIOTRASE**

| | |
|---|---|
| *Trypsin pur.* | 0.16% |
| *Ca-N-Hydroxymethylglutaminate* | 5.00% |
| 2,2¹ *thiobis-(4,6-dichlorophenol)* | 0.50% |
| *Carbamide B.P.* | 5.00% |
| *In polyethylene glycol* | |

Biotrase is available in 35 g. tubes at a basic N.H.S. price of 3/9d. plus Purchase Tax. Samples and literature are available to medical practitioners on request.

# Biotrase

*'Biotrase' is a registered trade mark of*

**LLOYD-HAMOL LIMITED**

**11 Waterloo Place, London, S.W.1.**

# NO LONG FACES WHEN CHILDREN TAKE . . .

Maw's

# Tancolin (Regd.)

## CHILDREN'S COUGH LINCTUS

| Active Ingredients | %W/V |
|---|---|
| Theophylline ... | 0.33 |
| Ethylmorphine Hydrochloride | 0.025 |
| Sodium Antimonyl Tartrate | 0.00125 |
| Ascorbic Acid ... | 0.25 |
| Glycerin ... | 20.8 |
| Sodium Citrate ... | 2.0 |
| Citric Acid ... | 1.0 |

***Tangerine Flavoured*** to provide an immediately acceptable and effective treatment, appealing instantly to even the most unco-operative child patient. Tancolin combines a pleasant vehicle with a rational formulation — specifically for children.

TANCOLIN has been designed to give a twofold anti-spasmodic and sedative action. The inclusion of a demulcent, a reflex expectorant and added Vitamin 'C' content are valuable adjuncts to this primary function.

TANCOLIN is indicated for treatment of the distressing and irritating cough associated with the common cold, Bronchospasm Bronchitis and Inflammatory and Catarrhal affections of the Respiratory Tract.

TANCOLIN is freely prescribable on E.C.10 (Cat. 3/4) and achieves therapeutic efficiency with economy.

***S Maw Son and Sons Limited · Barnet · England***

G147A

# Night attack

The angina patient goes to bed in fear and may wake in agony. Peritrate prophylaxis can ease his mind considerably. Since Peritrate is a *long-lasting* coronary vasodilator, a single dose affords protection for as long as 4 to 5 hours . . . a considerable part of the night. Peritrate will not abort attacks completely — but it prevents attacks or reduces their severity in up to 80% of cases. Exercise tolerance is increased, nitroglycerin intake is reduced and very few side-effects occur.

**Active principles:** Pentaerythritol tetranitrate 10 mg.

**Packing:** Bottles of 50 tablets and packs of 500 supplied to chemists for dispensing only.

PERITRATE WITH PHENOBARBITONE. (Peritrate 10 mg. with Phenobarbitone 15 mg.) is also available, similarly packed.

WARNER

# Peritrate

Trade Mark

WILLIAM R. WARNER & CO. LTD., POWER ROAD, LONDON, W.4.

17

# Milk-alkali drip therapy without a tube

# NULACIN

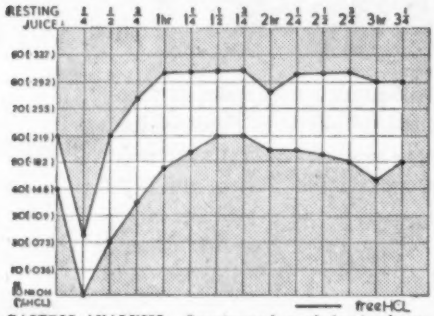
A most effective control of gastric acidity is milk-alkali drip therapy; the most convenient way of obtaining milk-alkali drip therapy is by sucking Nulacin tablets.

Thus, Nulacin is of great value in the treatment of peptic ulcer in the ambulatory patient, and in the prevention of ulcer relapse.

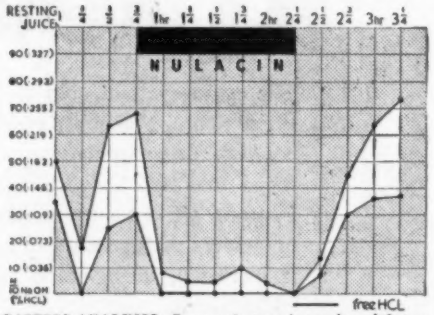
Nulacin tablets are prepared from whole milk combined with dextrins and maltose, and incorporate Magnesium trisilicate 3.5 grs; Magnesium oxide 2.0 grs; Calcium carbonate 2.0 grs; Magnesium carbonate 0.5 grs; Ol. menth. pip. q.s. Their shape, size and consistency are such that, when they are allowed to dissolve slowly in the mouth control of gastric acidity can be achieved. Up to three tablets an hour may be required to give continuous neutralization of the gastric contents.

Nulacin tablets are not advertised to the public, have no B.P. equivalent, and may be prescribed on E.C.10. The dispensing pack of 25 tablets is free of Purchase Tax. (Price to Pharmacists is 2/-.) Also available in tubes of 12.

Nulacin is available throughout the British Commonwealth, in the U.S.A. and in many other countries. It is known as Nulactin in Canada and Sweden.




**GASTRIC ANALYSIS.** *Superimposed gruel fractional test-meal curves of five cases of duodenal ulcer.*




**GASTRIC ANALYSIS.** *Same patients as in graph on left, two days later, showing the striking neutralizing effect of sucking Nulacin tablets (3 an hour). Note the return of acidity when Nulacin is discontinued.*

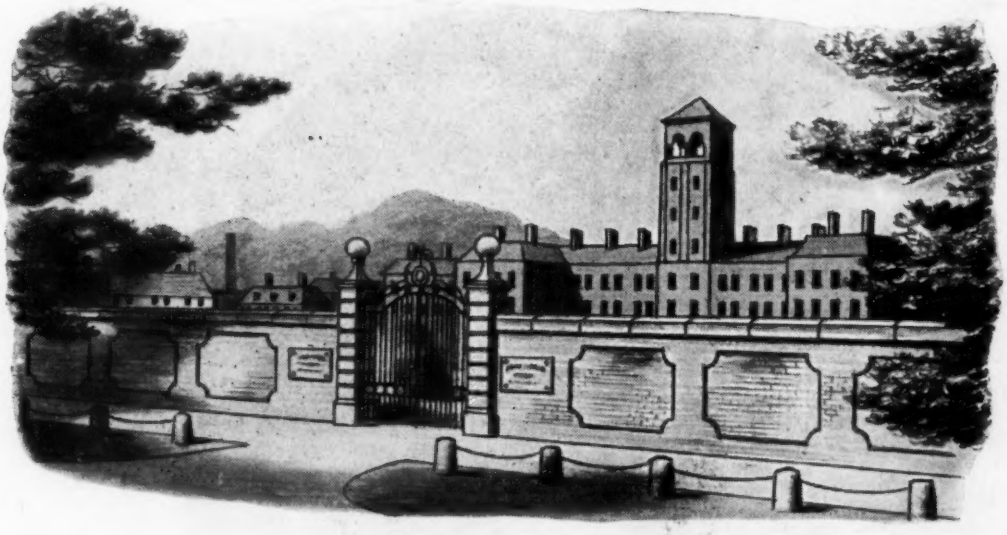
**BIBLIOGRAPHY:**

The Control of Gastric Acidity. *Brit. Med. J.* 26th July, 1952, 2: 180-182. Medical Treatment of Peptic Ulcer. *Med Press* 27th February, 1952, 227: 195-199. Notes on Remedial Agents. *Med Rev.* September, 1952, 46: 162. Discussion on Peptic Ulceration. *Proc. Roy. Soc. Med.* May 1953, 46: 354. The Effect on Gastric Acidity of "Nulacin" tablets. *Med. J. Aust.* 28th November, 1953, 2: 823-824. Control of Gastric Acidity by a New Way of Antacid Administration. *J. Lab. Clin. Med.* 1953. 42: 955. Further Studies on the Reduction of Gastric Acidity. *Brit. Med. J.* 23rd January, 1954, 1: 183-184. Clinical Investigation into the Action of Antacids. *The Practitioner* July, 1954, 173: 46. Management of Peptic Ulceration in General Practice. *Med. World* December, 1954, 81: 591-601. Ambulatory continuous Drip Method in the Treatment of Peptic Ulcer. *Amer. J. Dig. Dis.* March, 1955, 22: 67-71. Notes on Remedial Agents. *Med. Rev.* October, 1955, 49: 142. Antacids in Peptic Ulcer. *The Practitioner*, January, 1956, 176: 103.

**Samples available on request**

**HORLICKS LIMITED**

*Pharmaceutical Division, Slough, Bucks.*



# MILTOWN*

*TRADE MARK

MEPROBAMATE

## *promises much in mental illness*

The virtues of MILTOWN as a powerful yet safe tranquillizer in the psychoneuroses are already widely recognised. Preliminary experience with the drug in psychotic patients now indicates that it may play an important part in the treatment of mental disease. In a dosage higher than that used for the psychoneuroses, MILTOWN may benefit delusional, assaultive, noisy and hallucinated patients, restoring well-being, calmness and serenity. Some manic-depressives and hypomaniacs have also been favourably affected by the drug.

MILTOWN has been used successfully as a premedication in E.C.T. and as a valuable aid in psychotherapy. It has not been reported to elicit suicidal tendencies. The low incidence of side effects and a low toxicity are notable features in therapy with MILTOWN. The drug has been given over long periods to psychotic patients without ill effects.

**MILTOWN** ***is the one tranquillizer that relaxes both mind and body***

MILTOWN Meprobamate is 2-methyl-2-n-propyl-1, 3-propanediol dicarbamate.
Bottles of 50 and 500. 400 mg. tablets

**LEDERLE LABORATORIES DIVISION**
*Cyanamid* PRODUCTS LTD. **LONDON, W.C.2**

# *Children like it... worms don't*

One week's treatment with 'Antepar' Elixir is usually sufficient to eradicate *threadworms*. A single dose clears *roundworms* from the gut. Effective without fasting, purging or supporting measures, 'Antepar' acts by paralysing the worms—they are then expelled by normal peristalsis.

'Antepar', the original elixir of piperazine, is well tolerated by patients of all ages. Its pleasant taste is popular with children. Containing piperazine citrate equivalent to 500 mgm. of piperazine in each fluid drachm, 'Antepar' is supplied in bottles of 4 fl. oz. and 20 fl. oz.

## 'ANTEPAR' ELIXIR

BURROUGHS WELLCOME & CO. (THE WELLCOME FOUNDATION LTD.) LONDON

Associated Houses:
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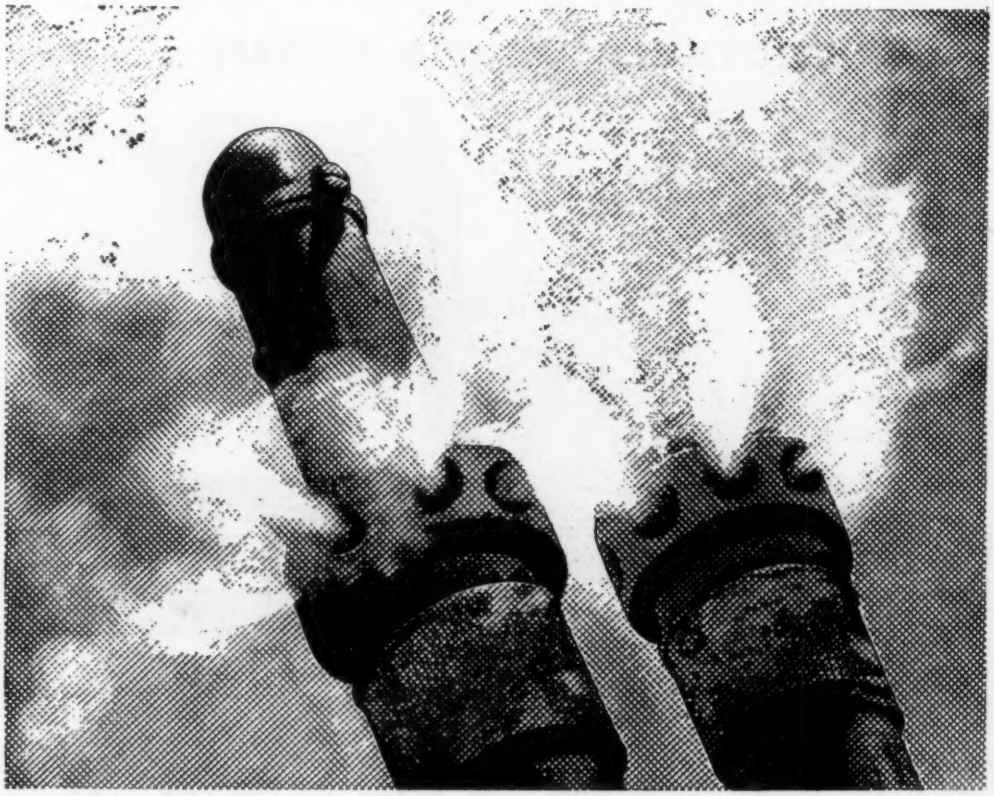


# IN SEVERE HYPERTENSION

In dangerously high blood pressure oral therapy with 'Ansolysen', the long-acting pentolinium preparation, frequently permits a patient incapacitated by the disease to return to near-normal activity. At the same time organic damage may often be arrested and in some cases reversed.

In conjunction with the Rauwolfia alkaloid reserpine, used only where there is no history of mental depression, the hypotensive effect of pentolinium is in many cases maintained with greater smoothness.

*PRESENTATIONS*

**'Ansolysen'** *Tablets of 10, 40 and 200 mgm.*

*0·5 per cent and 2·5 per cent solutions for injection.*

*1 per cent and 2·5 per cent solutions for injection, each with 0·5 per cent ephedrine hydrochloride.*

**Reserpine** *Tablets of 0·25 mgm. and 0·5 mgm.*

*MANUFACTURED BY*

**MAY & BAKER LTD**

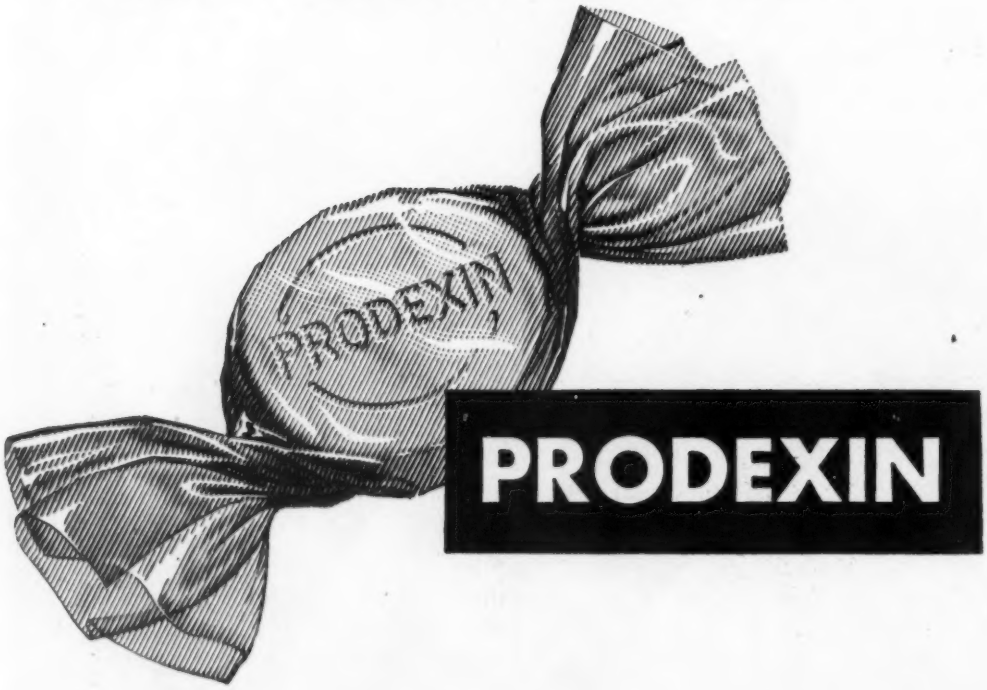
## 'ANSOLYSEN'

*trade mark* PENTOLINIUM TARTRATE *brand*

*An* **M&B** *brand Medical Product* MA3711

*DISTRIBUTORS:* PHARMACEUTICAL SPECIALITIES (MAY & BAKER) LTD · DAGENHAM · ESSEX

# PREDICTABLE *ANTACID THERAPY*




1 **rapidly relieves gastric pain**
2 **safely buffers excess acid**
3 **non-alkalising**
4 **non-constipating**
5 **stable, consistent and predictable**

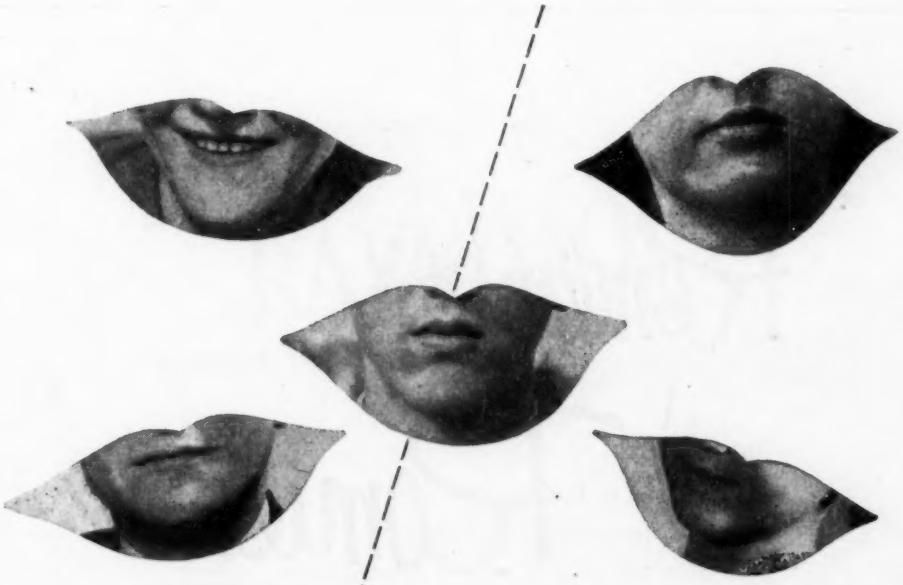
**Prodexin tablets provide the advantages of alumina buffer therapy without its disadvantages.** The tablets are pleasant to take and when slowly sucked provide antacid control comparable with that obtained by drip therapy. Prodexin, however, unlike milk-alkali regimes, does not aggravate acid secretion.

**PRODEXIN**
Dihydroxy aluminium aminoacetate...0·9 gm.
Magnesium carbonate.....0·1 gm.

*Cartons of 30 singly wrapped tablets.*

*Dispensing packs of 240 tablets (basic N.H.S. cost 30/4d.)*

**C. L. BENCARD LTD** · PARK ROYAL · LONDON · N.W.10



*For infections of the mouth and throat and for the relief of sore throat and laryngitis*

# 'HIBITANE'

*Formula:*
*'Hibitane' Dihydrochloride 5 mg.*
*Benzocaine B.P. 2 mg.*

## ANTISEPTIC LOZENGES

**NOTEWORTHY FEATURES:**

★ Powerful antibacterial effect against Gram-positive and Gram-negative organisms. Also active against Monilia and Aspergillus.

★ The saliva produced when sucking a lozenge is highly bactericidal to mouth pathogens. Saliva tests show 'Hibitane' lozenges to be far superior to other antiseptic lozenges.

★ Low oral toxicity; harmless to the tissues locally.

★ No sensitivity reactions, local or general, have been reported with 'Hibitane'.

★ Bacteria do not develop resistance to 'Hibitane', nor can resistance be induced *in vitro*.

★ The small quantity of benzocaine is sufficient to ease the pain of a sore throat without interfering with the swallowing reflex.

★ The lozenges are pleasantly flavoured and well liked by children.

**'Hibitane' Lozenges are issued in tubes of 12. Basic N.H.S. cost 1/5d. (plus purchase tax) for 12 lozenges.**

IMPERIAL CHEMICAL (PHARMACEUTICALS) LIMITED · WILMSLOW · CHESHIRE
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*A subsidiary company of Imperial Chemical Industries Limited*

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# Remember 'Romilar'

## the Roche cough specific

'ROMILAR' is a true specific which may be prescribed for all types of useless cough.
'ROMILAR' (+)-3-methoxy-N-methylmorphinan hydrobromide is presented as a palatable syrup; bottles of 100 c.c. and 500 c.c.

DOSAGE *Adults*: One to two teaspoonfuls (15 mg. to 30 mg.)
*Children*: Half to one teaspoonful (7·5 mg. to 15 mg.)
*Infants*: One quarter to one half teaspoonful (3·75 mg. to 7·5 mg.)
These doses may be given one to four times daily.

ROCHE PRODUCTS LIMITED · 15 MANCHESTER SQUARE · LONDON · W.1

In Hypertension

# RAUWILOID

**Reduces the pressure gradually and safely . . .**

Of *proved* value in the treatment of mild to moderate hypertension, 'Rauwiloid' is a purified and standardized fraction of *Rauwolfia serpentina* in tablet form. It lowers elevated blood pressure *gradually*, slows the pulse rate, and so reduces cardiac effort. A calm, tranquil sense of well-being is induced, without drowsiness, and with little impairment of alertness. Dosage is not critical, and there are no important side-effects or contra-indications. Mental depression is unlikely to be encountered when 'Rauwiloid' is used in the recommended dosage. It is the medicament of choice for hypertension in its early stages, in order to arrest progression.

'Rauwiloid' contains 2 mg. of the active hypotensive alkaloids of *Rauwolfia serpentina* per tablet, undesirable constituents of the crude root being excluded by the extraction process.

**Dosage is simple—two tablets taken at bedtime.**

**Full literature on request.**

RIKER

*'Rauwiloid' is a registered trade-mark. Regd. Users :*

**RIKER LABORATORIES LIMITED**

LOUGHBOROUGH LEICS

*NOW POSSIBLE!*

## INCREASED SAFETY AND EFFICIENCY WITH

# HYDROMYCIN

### IN THE TREATMENT OF INFLAMMATORY SKIN CONDITIONS

HYDROMYCIN by combining the anti-inflammatory properties of Hydrocortisone with the anti-bacterial properties of Neomycin offers increased safety over the use of Hydrocortisone alone. HYDROMYCIN is ideal in the treatment of contact dermatitis, atopic dermatitis and non-specific pruritus.

**SKIN OINTMENT** *Tubes of 5G and 15G*

**EAR/EYE OINTMENT** *Tubes of 3G*

THE FULL RANGE OF BOOTS BRITISH-MADE CORTI-COSTEROIDS

CORTISTAB (Cortisone Acetate) Tablets, Injection, Eye Drops, Eye Ointment.
HYDROCORTISTAB (Hydrocortisone) Tablets, Local & Intravenous Injections, Skin Ointment, Eye Ointment, Eye Drops.
DELTA-STAB (Prednisolone) Tablets.
Delta-stab Tablets are at present available through N.H.S. hospitals only by arrangement with the Ministry of Health.

BOOTS PURE

Literature and further information gladly sent on request:
DRUG COMPANY LIMITED, NOTTINGHAM

Boots

# Introducing 'migril' for

# 3D relief in migraine

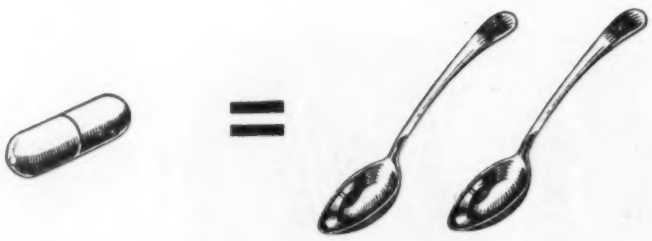
**Dispels headache**
**Disperses visual disturbances**
**Defeats nausea and vomiting**

A new product—'Migril'—provides, for the first time, a successful 3-way attack on migraine.
'Migril' contains ergotamine tartrate (2 mgm.), caffeine (100 mgm.) and cyclizine hydrochloride (50 mgm.) in each tablet. The inclusion of cyclizine hydrochloride not only eliminates the nausea and vomiting often associated with migraine but also **enables larger and more effective doses of ergotamine to be administered.**

## 'migril'
BRAND

Ergotamine Compound *(Compressed)*
PACKS OF 10 AND 100

BURROUGHS WELLCOME & CO. (THE WELLCOME FOUNDATION LTD.) LONDON



# *The acceptable answer for children*

Alficetyn Suspension provides distinct advantages in oral chloramphenicol therapy. It is so palatable that no difficulty will be found in administering it even to very young children.

Alficetyn Suspension has a wide range of therapeutic activity when given by mouth and it is indicated in all infections amenable to chloramphenicol therapy including, bacterial pneumonia, virus pneumonia, whooping cough, urinary tract infections, typhoid fever and mastoiditis.

# ALFICETYN SUSPENSION

Each teaspoonful (4 c.c.) of Alficetyn Suspension contains chloramphenicol cinnamate equivalent to 125 mg. of chloramphenicol B.P. together with 0·032 mg. atropine sulphate. Bottles of 60 c.c.

C56/423/454/H

ALLEN & HANBURYS LTD · LONDON · E·2

TELEPHONE: BISHOPSGATE 3201 (20 LINES). TELEGRAMS: "GREENBURYS, BETH, LONDON"

# SOME EFFECTS OF HIGH ALTITUDE ON MAN

L. G. C. PUGH
M.A., B.M. Oxfd

M. P. WARD
B.A., M.B. Camb., F.R.C.S.

*From the Division of Human Physiology, National Institute for Medical Research, London*

THE expeditions sent out to the Himalayas by the Himalayan joint committee of the Alpine Club and the Royal Geographical Society in 1951, 1952, and 1953 form a closely linked series. In 1951 the southern route on Mt. Everest was discovered; in 1952 a training expedition was sent to Mt. Cho Oyu, on which medical and physiological problems, particularly the use of oxygen, were studied; and in 1953 Mt. Everest was climbed for the first time.

These expeditions provided unusual opportunities for observing the effects of altitude on men taking part in successive expeditions, as well as the modifying influence of factors such as improved acclimatisation and nutrition and the use of oxygen equipment.

The early part of the three expeditions was much the same. The first seventeen days were spent marching 140–160 miles through the Himalayan foot-hills at heights ranging from 4000 to 12,000 ft., after which a main base camp was established at 12,000–13,000 ft. The next two and a half months were spent mainly at heights between 18,000 and 22,000 ft.; but, whereas the 1951 and 1952 expeditions went straight to 18,000 ft. and did not come down again for several weeks, the Everest party devoted nearly a month to preliminary acclimatisation, making several short visits to 18,000 ft. and returning in the intervals to 13,000 ft. to rest. This phase of the Everest 1953 expedition was followed by a month spent at 18,000–22,500 ft. establishing camps and transporting stores up the Khumbu glacier. The final phase on the Lhotse face and South Col (26,000 ft.), including the ascent to the summit (29,002 ft.), lasted about fourteen days. The 1951 and 1952 expeditions did not go above 23,000 ft.

The Everest party had considerably more experience of high altitude than had the 1951 and 1952 parties, which included a high proportion of "first-timers." Of the 12 members of the Everest team 3 had taken part in both previous expeditions and 3 others in one of them; and 4 of the remaining 6 had previous Himalayan experience.

### Heights up to 12,000 ft.

No adverse effects were noted during the approach marches. Climbing-rates of 2000–2500 ft. an hour were usually maintained on long ascents and were unimpaired up to 12,000 ft. Above 8000 ft. there was an increase in pulse-rate during sustained climbing, but one did not become aware of hyperpnœa until reaching 12,000 ft. Cheyne-Stokes breathing in men who were asleep was observed at heights as low as 10,000 ft. During the first twenty-four hours after the main base had been set up complaints of headache were not unusual and there were signs of irritability, but these effects soon passed off.

### Heights up to 20,000 ft.

On the way up to 18,000 ft. most newcomers to the Himalayas suffered rather severely with dyspnœa, weakness, and fatigue; and climbing was a great effort. Some had acute symptoms—e.g., headache, loss of appetite, nausea, and vomiting. Band, in 1953, found he got considerable relief by hyperventilating, which he did on the advice of Evans, a very experienced climber who was hardly affected by these heights. Men who had been in the Himalayas before were much less affected than newcomers. For example, Lowe, in 1953, recorded that he had virtually no altitude symptoms at 19,000 ft., whereas the previous year (his second visit to the Himalayas) he had suffered severely with headaches, anorexia, and lassitude on his first day at this altitude. Shipton, the leader of the 1951 and 1952 expeditions, seemed to be quite unaffected by altitudes below 20,000 ft.

On the Cho Oyu expedition, however, one of us (G. P.), on joining the main party at 17,000 ft. a few days after their arrival there, was struck by their cyanotic appearance, the absence of the customary gaiety and conversation at meals, and reduction of casual activity in camp. The Sherpas appeared to suffer no ill effects; nor did they show any sign of fatigue after carrying 60-lb. loads all day. At this phase of the Cho Oyu expedition respiratory troubles and diarrhœa began to reduce the efficiency of the party; at one time half the climbers were sick. The impression gained during the next four weeks on Cho Oyu was that the physical performance of the Europeans continued to be inferior to that of the Sherpas. (The climbers themselves were, however, unwilling to admit this afterwards.) Appetites remained poor, and there was an average weight-loss of 11 lb. in twenty-six days. Some of the climbers developed cravings for foods such as tinned salmon and pineapple cubes, which were unavailable, and preferred to go without rather than eat food that was distasteful to them. Their appetite for sweet foods, on the other hand, increased; the consumption of sugar rose to 12 oz. per man per day, compared with 6 oz. on the approach march (Pugh 1954a). They also drank a good deal, the average fluid intake being 3–4 litres a day. Later in the expedition, after a rest at lower altitude, the physical performance of the party improved, appetite returned, and tolerance of the bulky native diet increased.

On Mt. Everest the following year the general health of the party was much better. Respiratory troubles and diarrhœa developed during the acclimatisation phase, but there was practically no sickness on the mountain itself. Although there were initial lassitude and depression of appetite at the Base camp at 18,000 ft., these symptoms passed off within a fortnight, and thereafter the party felt well and energetic. Film sequences taken on the ice-fall of the Khumbu glacier showed men cutting steps with precision and climbing with apparently normal rhythm and balance. Subjectively, however, climbing required more effort at that height than lower down, and endurance was reduced.

On all these expeditions one was conscious of hyperpnœa at rest and during work all the time above 18,000 ft. Cheyne-Stokes breathing could be observed in men at rest and asleep. The sequences often consisted of about six respirations followed by a pause of 10 sec.

A note made at base camp (18,000 ft.) on Mt. Everest records an observation on Hillary and Lowe sleeping in the mess tent after lunch. In Hillary the respiratory cycle consisted of two respirations, each lasting 3 sec., followed by a 10-sec. pause. In Lowe the cycle was three respirations with a 10-sec. pause.

During exercise very high ventilation-rates were maintained. Measurements on men climbing at their normal pace at 20,000 ft. in 1952 yielded values of 74–123 litres a minute (at 37°C observed pressure, saturated). Respirations were 40–50 a minute during sustained climbing and up to 60 a minute during maximal effort. In association with the continual hyperpnœa some men developed a bruised aching feeling round the lower margin of the ribs, resembling the pain of chronic muscle fatigue.

Resting pulse-rates in 5 partially acclimatised men at 20,000 ft. ranged from 80 to 88, compared with 50–70 in the same men at sea level. Blood-pressures were unaffected, except for a rise in diastolic pressures in some men. During normal sustained climbing at 20,000 ft. pulse-rates of 120–140 were noted.

After about a fortnight at 18,000 ft. the initial disinclination for mental effort passed off, and one could do complicated mental work accurately, although more slowly and with greater effort than at sea level. One also needed more sleep at these altitudes: most people slept ten to twelve hours a night, except at first, when sleep was interfered with by restlessness and paroxysmal dyspnœa.

### From 20,500 ft. to 22,000 ft. (Western Cwm)

In the Western Cwm on Mt. Everest individual differences in tolerance of altitude began to be obvious. Climbers also noticed wide variation in their performance and well-being from day to day and even within a day. Going for too long without food caused unusual fatigue, which could be relieved immediately by taking sugar. The same thing happens in the Alps, but the beneficial effect of sugar seemed much more striking at these altitudes than there. Mental activity was not seriously impaired. Westmacott claimed to have solved two-thirds of the *Times* crossword puzzle in one afternoon. Gas analysis was done by one of us (G. P.) for six hours a day. Subsequent checking revealed few mistakes in the calculations. One had to be careful, however, to write down observations and figures immediately because of forgetfulness. Supplementary oxygen at 18,000–20,000 ft. had relatively little effect in acclimatised men at rest and caused only a minor reduction in breathing, but during climbing there was a 20–50% reduction in ventilation though little increase in speed (Pugh 1954a): endurance, however, was much improved, and one had a feeling of increased energy and strength.

The average daily intake of food was about 3900 calories, compared with 3000 calories or less the previous year (Pugh 1954a). European-type "compo" rations were used, supplemented with fresh meat, eggs, and potatoes. Pressure-cookers and special stoves made it possible to prepare appetising meals at heights where cooking is otherwise too slow and expensive of fuel to be practicable, owing to the low boiling-point of water (80°C at 20,000 ft.). In four weeks spent in the Western Cwm and above, the average weight-loss was only 4 lb.

Previous parties on Everest became severely emaciated at these altitudes (Hingston 1925, Ruttledge 1934).

### From 22,500 ft. to 26,000 ft. (Lhotse Face)

In this range of altitude the struggle against weakness, fatigue, and shortness of breath was severe, and the beneficial effect of oxygen became increasingly apparent. Individual variation in tolerance of altitude was even more obvious than it had been on the ice-fall and in the Western Cwm. Lowe, who with a Sherpa, Ang Nyima, worked for nine days on the route between 22,000 ft. and 25,000 ft., said that it was only at the end of this time that he was beginning to deteriorate. The two newcomers, on the other hand, became exhausted and had to be sent down to Base Camp (18,000 ft.) to rest.

There was considerable impairment of the mental faculties at these heights. This was brought home to the climbers by the fact that oxygen increased the awareness and enjoyment of their surroundings. On seeing film sequences the climbers were impressed with the slow feeble strokes of the ice-axe, of which they had been unaware at the time. Routine jobs were done successfully, but tasks that required thought and initiative were done with difficulty. Ward, for example, successfully took samples of alveolar air at Camp 7 (24,000 ft.). This was a somewhat complicated procedure, but one which he had often practised. On trying to mend a primus stove he had great difficulty in finding and correcting a simple fault.

### 26,000 ft. (South Col)

The account which follows is based on notes taken down by us at Camp 4 and at Base Camp immediately after the assault. The Swiss Foundation for Alpine Research had warned us of the discrepancies which might occur between accounts written down on the spot and stories subsequently told by climbers after their return home.

The effects noted on the South Col were those of mental and physical depression, with retardation of thought and action, impairment of insight, and impoverishment of affect. As an example of retardation, Bourdillon described taking $1^1/_2$ hours to go through the procedure for detecting faults in the closed-circuit oxygen apparatus, which 5000 ft. lower down took him only 20 minutes. There was an immense increase in the effort required to initiate thought or action; but once an activity had been embarked on it could be carried through to the end. A course of action planned ahead, such as arrangements for supporting the assault parties, was carried out meticulously, but the capacity for adaptive behaviour seems to have been much impaired. This was in evidence even at Camp 7 (24,000 ft.):

> On returning there the day after his climb to 28,700 ft. Bourdillon collapsed and lay exhausted outside his tent. The sight of him lying there provoked nothing more than the comment "Poor old Tom, he's had it." Lower down an attempt would undoubtedly have been made to help him. It is also probable that Bourdillon, in view of his profoundly exhausted condition, would have been given oxygen for sleeping during the night (May 26) after his climb to South Summit (28,700 ft.), if this contingency had been envisaged and the appropriate plan made beforehand.

Impairment of insight and judgment is illustrated in Hillary's account of Hunt's condition on the morning of May 27:

> Hunt had been three days on the Col by this time and was, in their view, clearly incapable of remaining there longer. He himself, however, was determined to stay on to direct the assault parties, and it was not without some argument that he was persuaded to go down by Lowe, who, having just come up from Camp 7 (24,000 ft.), was relatively fresh and unaffected by the altitude. Lowe and Hillary both described Hunt's condition as resembling drunkenness, yet, in spite of his reeling, unsteady gait when roping up with Evans, Bourdillon, and Ang Nyima for the descent to Camp 7, he regarded himself as fit to lead the party down in safety. Although, in his own account of the situation (Hunt 1953), Hunt has described great weakness and fatigue, there seems little doubt that he was not fully aware of the severity of his condition.

On the South Col, as at lower altitudes, blunting of thought was brought out by the contrast on using oxygen; the climbers again described how, when breathing oxygen, they took an active interest in their surroundings and enjoyed their climbing.

Only 1 of 4 Sherpas (excluding Tensing) was fit enough to carry on above the South Col. The others were too weak to start or were prostrated with vomiting. One reason for this was that they did not have oxygen at night. Of the Europeans, Bourdillon seemed to fare the worst. During the night of his return from the ascent with Evans to the South Summit (28,700 ft.) he thought he was going to die. Next morning he kept falling down on the short ascent to the top of the Col and complained of weakness and paræsthesia of his legs. With oxygen he was able to continue and got down safely to Camp 7.

With the exception of Noyce, who slept well without it, the Europeans used oxygen for five to six hours each night for sleeping. Oxygen brought an immediate feeling of warmth, sound sleep, and greatly improved recovery from fatigue. During climbing, in addition to the increase of energy and the relief of breathing, which had been noted at lower altitudes, oxygen greatly improved the rate of climb. Evans and Bourdillon (Bourdillon 1954), on closed-circuit oxygen, climbed from 26,000 ft. to 27,500 ft. at the rate of 930 ft. an hour, making their own track and carrying loads of 43 lb. This was judged to be an Alpine standard of performance in view of the conditions and contradicts the statement that oxygen has relatively little effect on performance in acclimatised men. Hillary and Tensing on the second assault used open-circuit oxygen at 4 litres a minute over the same route and climbed at 620 ft. an hour in a track prepared for them by their support party. Thus the effect of open-circuit oxygen on the rate of climb was less than that of closed-circuit oxygen, in which oxygen is breathed at sea-level pressure.

No ill effects were experienced on turning off the oxygen, so long as the climber rested a few minutes to recover his breath before taking off his set. Sudden failure of the oxygen-supply during climbing caused acute dyspnœa, weakness, dizziness, and, in 2 cases, incontinence of urine: it had been previously thought by some that sudden failure of the apparatus might cause unconsciousness. Slow failure was apt to pass unnoticed: the climber would be brought to a halt by increasing fatigue and breathlessness, without realising that his set was at fault.

### 27,900 ft. and Above

The final camp on Mt. Everest was placed at about 27,900 ft. Hillary and Tensing spent from 2 P.M. to 5 P.M. levelling a platform and pitching the tent. They worked steadily without extra oxygen, pausing every few minutes to rest. They used oxygen for about four hours during the night, and next day (May 29) reached the summit on 3 litres of oxygen a minute. On the summit Hillary took off his oxygen set and spent ten minutes taking photographs. He remembered to increase the shutter speed of a camera in case of freezing. He walked about on the level without difficulty. After about eight minutes he began to feel weak and fuddled; so he put himself on oxygen again. On the descent the oxygen supply ran out just as they reached the South Col. They noticed little difference, except that walking uphill was harder. Lowe has recorded, however, that they were walking very stiffly when they got back to the Col, although their condition was much better than that of any other returning party.

### Physical Examination

On their return to the Western Cwm from the Lhotse face, South Col, and above, European and Sherpa members of the party were submitted to physical examination.

*May 16, Camp 3 (20,500 ft.)*

Westmacott was examined on arrival at Camp 3 (20,500 ft.) having spent the previous night at Camp 4 (21,200 ft.) and four nights before that at Camp 5 (22,500 ft.). This was his first experience of the Himalayas. He had been working on the Lhotse face and had become exhausted climbing in deep soft snow. On reaching Camp 3 his gait was unsteady, and he was clearly in a state of great exhaustion. The following notes of his pulse-rate and blood-pressure were made:

| *Time of day* | *Blood-pressure (mm. Hg)* | *Heart-rate (beats per min.)* | |
|---|---|---|---|
| 12·00 | 86/ | 66 | Hands cold |
| 13·25 | 86/66 | 88 | |
| | 20 min. on 4 litres of oxygen a minute | | |
| 13·48 | 86/66 | 88 | Dorsal veins of hand now full, brachial pulse now easy to feel, peripheral vasodilatation |

This showed a low blood-pressure state associated with extreme exhaustion. Westmacott's blood-pressure was normally 120/80 mm. Hg.

*May 25, Camp 4 (21,200 ft.)*

Three Sherpas were examined five minutes after their arrival at Camp 4 from the South Col, having on that day carried 40-lb. loads from Camp 7 to the South Col in eight hours without supplementary oxygen. They had previously visited the Col on May 22. The men appeared cheerful; they were tired but not exhausted. The following observations were recorded:

| *Sherpa* | *Age (yr.)* | *Apex-beat* | *Radial pulse* | *Heart-rate (beats per min.)* | *Blood-pressure (mm. Hg)* |
|---|---|---|---|---|---|
| Topke .. .. | 18 | Nipple line | Irregular, full | 100–104 | 104/70 |
| Dawa Thondup .. | 49 | Not displaced | Regular, full | 112 | 120/84 |
| Ang Norbu .. | 38 | Not displaced | Regular, full | 100 | 120/86 |

*May 27, Camp 4 (21,200 ft.)*

Four Sherpas were examined on their return from the South Col (25,800 ft.). Da Namgyal was the only one of this party who was obviously exhausted. He had spent the night of May 26–27 at Camp 7 and the previous two nights on the South Col. Anullu and Da Tensing had carried loads from Camp 7 to the South Col and returned the same day. The following observations were recorded:

| *Sherpa* | *Age (yr.)* | *Apex-beat* | *Radial pulse* | *Heart-rate (beats per min.)* | *Blood-pressure (mm. Hg)* |
|---|---|---|---|---|---|
| Balu .. .. | .. | Not palpable | Regular | 96 | 100/74 |
| Da Namgyal .. | 35 | Not palpable | Not palpable | 108 | 86/70 |
| Da Tensing .. | 40 | Not displaced | Regular | 100 | 140/100 |
| Anullu .. .. | 27 | .. | Regular | 100 | 110/80 |

Da Namgyal, the only one who was severely exhausted, had a low blood-pressure state like that seen in Westmacott on May 16.

*May 28, Camp 4 (21,200 ft.)*

The first assault party, consisting of Evans and Bourdillon, were examined. Both men had triangular patches of frostbite on each cheek between mask and goggles. Evans had slight conjunctivitis and an irritative cough. He was slightly cyanosed, and his resting pulse-rate was 80–90, but there were no other abnormal physical signs.

Bourdillon also was slightly cyanosed, with a resting pulse-rate of 110. Hunt, who was with Bourdillon and Evans, looked very fatigued. He was cyanosed and had an irritative cough. His resting pulse-rate was 100.

*May 30, Camp 4 (21,200 ft.)*

The second assault party were examined within an hour of their arrival from South Col on the day after the successful ascent by Hillary and Tensing. The climbers appeared very tired but not exhausted. Hillary seemed more tired than Tensing. In none of those examined was there any evidence of dilatation of the heart, rise of jugular venous pressure, or pulmonary congestion. The data recorded on these men were as follows:

| *Person* | *Date* | *Altitude (ft.)* | *Radial pulse* | *Heart-rate (beats per min.)* | *Blood-pressure (mm. Hg)* |
|---|---|---|---|---|---|
| Hillary | Apr. 6 | 2500 | .. | 64 | 100/58 after day's march |
| | May 30 | 21,200 | Not palpable | 88 | 80/760 after the assault |
| | June 2 | 18,000 | Not palpable | 80 | 106/84 |
| Lowe | Apr. 6 | 2500 | .. | 58 | |
| | | | | 66 | 126/74 |
| | May 30 | 21,200 | Weak, irregular | 104 | 115/90 |
| | June 2 | 18,000 | Weak, irregular | 82 | 112/82 |
| Tensing | May 30 | 21,000 | Full, regular | 81 | 140/86 |

*Body-weight (lb.) before and after assault*

| | May 14 | May 30 |
|---|---|---|
| Hillary .. .. | 150 | 148* |
| Tensing .. .. | 146 | 139 |
| Lowe .. .. | 144 | 148 |
| Gregory .. .. | 130 | 128* |

*Drank 3 or 4 500-ml. mugs of fluid just before being weighed.

| | Hæmoglobin (g. per 100 ml.) Day after assault | Week after assault |
|---|---|---|
| Hillary .. .. | 17·0 | 21·6 |
| Tensing .. .. | 17·8 | 18·4 |
| Lowe .. .. | .. | 21·1 |
| Gregory .. .. | 20·1 | .. |

*Chloride in urine collected on return to Camp 4 on May 30 after assault*

| | (m.eq. per litre) | (g. per litre) |
|---|---|---|
| Hillary .. .. | 180·4 | 6·40 |
| Tensing .. .. | 148·3 | 5·26 |

Specimen from Hillary, obtained at 5 P.M., two hours after arrival: pale heavy deposit of phosphates on cooling, no albumin, pH 5·5–5·8. Tensing could not pass a specimen until 8 P.M.

The condition of the men returning from very high altitude was surprisingly good. There was no evidence of cardiac dilatation as reported by Hingston (1925) on the 1924 expedition; nor was there evidence of dehydration, so far as could be judged by the body-weight and chloride content of the urine. The hæmoglobin values of Tensing and Hillary were below the average for the party, which was 20·9 g. per 100 ml. (Pugh 1954b), and both showed an increase at Thyangboche (13,000 ft.) a week later.

Of particular interest are the low blood-pressure states observed in Da Namgyal, Westmacott, and Hillary. The former two men were obviously in a state of profound exhaustion. Hillary, though very tired, was not exhausted. He ate 2 omelettes (4 eggs) and a third of a tin of salmon (8 oz.) shortly after arrival at Camp 4 (21,200 ft.) and two hours later had a further meal, consisting of potatoes, corned beef, and biscuits. He would hardly have done this had he been in a state of exhaustion. However, when his blood-pressure was measured his brachial pulse was felt with difficulty, his pulse at the wrist was impalpable, and his hands were cold. Lowe and Tensing, on the other hand, under the same conditions, had warm hands with well-filled veins and easily palpable pulses (the ambient temperature in the tent was 68°F). The signs in Hillary were therefore those of peripheral circulatory insufficiency. The condition could not be explained by dehydration, since the weight-loss of 5 lb. is not more than can be observed in climbers after an ordinary day's exercise, and the urinary chloride was normal. In the case of Westmacott the effect of breathing oxygen was tried. After twenty minutes on 4 litres of oxygen a minute his hands had become warm and their veins well filled, but there was little change in blood-pressure or in pulse-rate. Westmacott felt somewhat better, but the improvement was slight. Although oxygen was relatively ineffective in relieving exhaustion when given for only a short time, it was extremely effective when breathed overnight for eight or more hours.

## Discussion

### *Lack of Oxygen*

The effects of altitude experienced on Himalayan expeditions are those of chronic rather than acute lack of oxygen. Although few people escape acute symptoms altogether, the fully developed picture of acute mountain sickness (Barcroft 1925), characterised by headache, irritability, nausea, vomiting, cyanosis, fever, tachycardia, and dyspnœa and lasting one to three days, is rarely if ever observed. The principal effects experienced by Himalayan parties over 18,000 ft. are lassitude, retardation, impairment of appetite, hyperpnœa, Cheyne-Stokes breathing, and, during exercise, heaviness and weakness of the limbs, breathlessness, and reduced endurance. Usually no symptoms are experienced up to 12,000 ft. This is mainly due to the slow ascent because, although persons in good health can ascend from sea level to about 10,000 ft. in a day and stay there without discomfort, about 1 person in 2 has symptoms at 12,000 ft. if he stays there more than twelve hours (N. Pace, personal communication).

Between 15,000 ft. and 18,000 ft. acute symptoms are particularly liable to develop in parties ascending for the first time from 12,000 ft. This is explained by the fact that the oxygen-pressure is by this stage considerably reduced (being half sea-level value at 19,000 ft.) and by the fact that at this altitude parties move up their camps 2000–3000 ft. a day and thus expose themselves rather rapidly to fairly large falls in barometric pressure. The acute symptoms, however, pass off in a few days, and climbers then feel reasonably fit. Complete acclimatisation to 18,000 ft., if it ever takes place, must take a long time. Even after a month at 18,000 ft. the party on Everest in 1953 were impressed with the striking increase in well-being and energy on going down to rest at 16,500 ft. Stobart, who returned to the district the following year in search of the "abominable snowman," informed us that his party continued to improve over several months spent at 16,000–18,000 ft. This confirms the experience of the International Physiological Expedition of 1935, who observed that, even after six weeks at 17,000 ft., their acclimatisation was poor compared with that of the local inhabitants (Dill 1938).

Since altitude symptoms take several hours to develop, relatively unacclimatised persons may be able to climb from 12,000 ft. to 18,000 ft. with impunity, provided they return to a lower altitude to sleep. On the other hand, if they attempt to remain continuously at 18,000 ft. at an early stage, they suffer severely from the effects of altitude and deteriorate considerably before they eventually become acclimatised. The importance of not sleeping too high before acclimatisation is recognised by mountaineers in the Andes but has not been sufficiently appreciated by Himalayan climbers.

From 18,000 ft. up to 22,000 ft. the more acute symptoms of oxygen lack may not be much in evidence. This is explained by the fact that parties have usually spent some time at intermediate altitudes before establishing camps in this zone. The reduction in capacity for work prevents them from placing their camps more than 1500–2000 ft. apart. Moreover the curve relating barometric pressure to altitude is beginning to flatten off; consequently the change of pressure with altitude is less than in the 12,000–18,000 ft. zone.

Above 22,000 ft., when climbers are beginning to reach their limit, acute symptoms again make their appearance. At 26,000 ft. climbers may feel so ill that they think they are going to die. Contributory factors are exhaustion from excessive physical work, dehydration, and lack of food.

Although the effects of altitude on the South Col in 1953 were undoubtedly severe, the condition of most of the party appears to have been a good deal better than that of previous parties at comparable altitudes. This is attributable to adequate food and fluid (Pugh 1954a) and the use of oxygen equipment. The beneficial effects of oxygen in relieving fatigue and preventing deterioration were considered by the climbers to be at least as important as its effect on climbing. Climbers now consider that, for peaks up to 28,000 ft. in height, they can get on without oxygen for climbing, so long as they have it for sleeping.

### *Other Modifying Factors*

The intense heat and glare on Himalayan glaciers between 18,000 and 22,000 ft. on calm fine days is considered by some to be almost as important a cause of

headache and lassitude as is lack of oxygen. Measurements of skin-temperature on the 1953 expedition confirm the intense heating effect of the sun's radiation. Skin-temperatures of 114°F were recorded under clothing on the shoulders exposed to the direct sunlight compared with normal values of 94°F on the chest, which was in the shade. Without the sun, however, the cold is intense, and protective equipment is necessary. The effect of sugar in relieving fatigue and the increased appetite for sugar at great heights are of interest in view of the fact that experiments on animals have shown that mild hypoglycæmia sensitises the cerebral cortex to the adverse effects of lack of oxygen (Gellhorn 1953).

*Individual Variation*

Every Himalayan expedition has been impressed by the variation shown by different people in their tolerance of altitude and in the rate and degree of acclimatisation. They have also noted that the ability to acclimatise improves with each visit to the Himalayas, with the result that the old hand is usually much less affected than the newcomer by altitude. In spite of this, acclimatisation does not persist long after the climber's return to sea level; indeed climbers have had mountain sickness while climbing in the Alps within one or two months of returning from the Himalayas.

*Age*

The factor of age seems to be far less important in connection with acclimatisation than the factor of previous experience. Shipton, one of the most experienced of Himalayan climbers, seemed to be quite unaffected on Cho Oyu by altitudes up to 20,000 ft., although he was aged 45. Young men in their early twenties often suffer considerable distress at 20,000 ft., particularly if it is their first visit to such an altitude. On the Swiss expedition in 1952 the youngest Sherpa to reach the South Col was 17 and the oldest 47. It seems as if, in their case, there was no correlation between age and performance at altitude. The early thirties seem to to be the best age for very high altitude; older men also do well but are probably at a disadvantage beyond a certain altitude. The International Physiological Expedition of 1935 found an inverse correlation between age and tolerance of altitude (Dill 1938) but they were not concerned with mountaineers who had made a variable number of previous visits to altitude, as is always the case on Himalayan expeditions.

*Physical Training*

Climbers emphasise that, to acclimatise properly, one must "keep going," yet they do not generally undertake any special training to ensure that they are in good physical condition before an expedition starts. Since the war few British climbers have had the opportunity of building up the stamina for which Alpine guides are noted. It is perhaps for these reasons that we do not find British climbers doing eighteen-hour days at altitudes of over 18,000 ft., as is reported of certain professional Continental climbers.

The experience of Buhl, an Austrian professional guide, is a case in point; he spent nearly forty hours climbing from a camp at 22,800 ft. to the top of Nanga Parbat, 26,800 ft., and back in 1953. During this ascent he spent a night on a ledge just under the summit, with no protection. Though slightly frostbitten he is still doing hard climbs in the Alps.

*Limit of Altitude for Complete Acclimatisation*

The greatest altitude at which men are known to live permanently appears to be about 17,500 ft. A mining settlement at this altitude, situated on Aconquilcha in the Andes, was visited by the International Physiological Expedition of 1935. Attempts on the part of the mining authority to induce the miners to live at a higher altitude failed (Matthews 1954): after a few weeks they refused to continue to occupy a camp prepared for them near their work at 19,000 ft. because of insomnia, loss of appetite, and inability to enjoy their food. On this basis physiologists incline to the view that 18,000 ft. represents the limit at which full acclimatisation is possible.

LONGEST TIME SPENT AT VARIOUS ALTITUDES ABOVE 22,000 FT. ON EXPEDITIONS TO MOUNT EVEREST

| Altitude (ft.) | Time | Climber | Year |
|---|---|---|---|
| 23,000 | 11 days | Odell | 1924 |
| 22,000–24,600 | 11 days | Lowe | 1953 |
| 25,700 | 5 nights | Birnie | 1933 |
| 27,400 | 3 nights | Smythe | 1933 |

The only people to visit places higher than 20,000 ft. are mountaineers. Many mountaineering expeditions have spent up to four weeks at 20,000 ft. without ill effects apart from loss of weight, although lassitude and impairment of capacity for work are always present at these altitudes. Bauer's expedition to Kanchenjunga in 1931 remained six weeks at 20,000 ft. and higher, and reported feeling well at the end of it in spite of great loss of body-weight (Bauer 1931).

The time spent above 20,000 ft. decreases rapidly with each further increase of altitude (see table) and is determined by mountaineering requirements, weather, and questions of supply and maintenance as much as by physiological limitations.

Members of pre-war Everest expeditions claimed that some degree of acclimatisation was possible between 20,000 ft. and 23,000 ft. Somervell (1923) described how, on the 1922 expedition, he and his companion made three ascents from 22,000 ft. to 23,000 ft. at intervals of about three days and found the ascent easier on each occasion:

The first time "each step was a hardship, every foot a fight, until at last we lay almost exhausted on the top (North Col 23,000 ft.). After a day or two below at Camp 3 (21,000 ft.) we went up again. The ascent this time was hard work but not more than that, and after the col had been reached Morshead and I were sufficiently cheerful to explore the way leading up to Everest. A day or two later we again ascended, and never really noticed more discomfort than was occasioned by breathlessness."

On the 1925 expedition (Norton 1925) Odell, who seemed at first to acclimatise slowly, eventually became one of the fittest men at altitude. He spent eleven days at 23,000 ft. and climbed up to 25,000 ft. on three occasions. He reported climbing above 23,000 ft. more easily at the end of this period than at the beginning.

*Deterioration at Altitude*

By 1933 the view was generally accepted that partial acclimatisation was possible up to 23,000 ft. but was accompanied by physical deterioration shown by rapid loss of weight and by eventual intolerance of altitude with failing appetite, insomnia, increasing lassitude and weakness, and inability to recover from fatigue. It was recognised that little if any acclimatisation was possible above 23,000 ft., and deterioration was more rapid and severe the greater the altitude reached. Men staying above 25,000 ft. returned very emaciated and exhausted and took days or weeks to recover.

No Himalayan expedition has remained longer than five to six weeks at 20,000 ft., and it is not known for certain how long men could remain at that altitude. Conversations with members of the 1953 Everest expedition showed a general agreement that five to six weeks must be near the limit consistent with reasonable health and vigour. The length of time a man can stay at any given altitude varies greatly with the individual.

In the past, dehydration and lack of suitable food have accelerated deterioration, especially at the higher altitudes, but even on the 1953 expedition, when nutrition was properly cared for, deterioration still took place. Although a man may feel well for a time and may even seem to improve over the first few days, eventually his appetite begins to fail, he has difficulty in sleeping at night, and he feels increasingly lethargic by day. Eventually he can no longer work and has to go down.

Hunt, on returning from three days on the South Col, was so exhausted that for two days afterwards he had the voice and appearance of an aged man. Hillary stated that he took far more out of himself as a result of his ascent to the summit than he had done on any of his previous Himalayan expeditions, and it was only by the end of the return march to Katmandu that he felt himself getting back to normal.

*Some Other Effects of Altitude*

Examples of apparent impairment of judgment are not hard to find in Himalayan literature:

On the 1924 Everest expedition (Norton 1925) Odell, who was by far the best acclimatised and one of the most experienced mountaineers, was left behind, while Mallory made the second assault with Irvine, who was not even a trained mountaineer.

On the Italian expedition to K2 in 1954 the assault party ran out of oxygen some way below the summit and struggled on to the top still wearing their empty oxygen sets—it did not occur to them to remove them (Compagnoni and Lacedelli 1955).

Several instances of gross disturbance of cerebral function have occurred on Mt. Everest. On the 1933 expedition one of the party at a certain stage had the delusion that the medical officer intended to kill him. Smythe (1934), while climbing alone at 28,000 ft., saw "dark objects in the sky like kite balloons" and was convinced that he had a companion with him. Shipton had aphasia at 23,000 ft. after returning from his attempt to reach the summit with Smythe (Shipton 1943):

"It took us a very long time to get down from the North Col the next day. Immediately after we had started McLean became ill. He could hardly walk and had to be nursed carefully down the slopes. When we reached the bottom we found that a party had been sent up from Camp 3 to meet us with tea. When we had assembled to drink this, I suddenly found that I was suffering from aphasia and could not articulate words properly. For example, if I wished to say 'Give me a cup of tea,' I would say something entirely different—maybe tram-car, cat, feet . . . I was perfectly clear-headed; I could even visualize the words I wanted to say but my tongue just refused to perform the required movements . . . I think it was a form of migraine, a theory that is supported by the blinding headaches from which I suffered throughout that night. However, I was well again in the morning."

*After-effects*

Sufficient time has now elapsed to follow members of the early Everest expeditions in their subsequent careers, and it seems doubtful if any of the 8 climbers who have climbed to 28,000 ft. without oxygen suffered any permanent ill effects of the kind described in persons who have suddenly been exposed to atmosphere at 25,000 ft. or above in aircraft.

All these men have had careers of distinction and have reached posts that could hardly be attained by men with any significant degree of mental deterioration. Norton became a general; Somervell was a successful surgeon; Odell and Wager held professorial chairs; Shipton and Smythe, the latter now deceased, continued their careers as writers and explorers; Wyn Harris became a colonial governor; and Longland became a director of education.

One case of after-effects in a climber who spent five nights at 25,000 ft. has been noted. This climber was an A.D.C. at Government House in Calcutta, and as part of his duties he had to introduce guests to one another at social functions. Before going to Everest he could remember and instantly recall the names of some 100 guests; after returning he found his ability to do this was impaired, and he had to use a list.

*Technique of Acclimatisation*

Knowledge of the physiological changes taking place in the body during acclimatisation has so far contributed to the mountaineer little information of value about the best methods of arranging the stages of his ascent so as to acquire the best possible acclimatisation in the shortest possible time. A large body of empirical information, however, exists on this subject. It has been built up over many Himalayan expeditions and was collated and analysed during preparation for the Everest expedition.

The pre-war Everest expeditions approached the mountain by six weeks' march across the Tibetan plateau at 13,000 ft. with passes at 16,500 and 18,000 ft. In spite of this preliminary period of acclimatisation, in the 1933 and subsequent expeditions it was found advisable to spend several days at intermediate camps on the mountain between Base Camp at 16,500 ft. and the North Col at 23,000 ft. to maintain their fitness and to avoid the acute altitude symptoms, such as headaches and vomiting, from which the earlier expeditions had suffered. Ruttledge (1934), the leader of the 1933 expedition, held the view that climbers would stand a better chance of climbing Everest if they spent the whole winter in Tibet at 13,000 ft. or higher.

Other mountaineers were led by the successful ascent of Mt. Kamet (Smythe 1932) to doubt the value of prolonged acclimatisation. (Kamet (25,443 ft.) was climbed within a fortnight of establishing the base camp at 15,500 ft. after three weeks' approach march at altitudes mostly below 10,000 ft.) Moreover Sherpas, who live permanently at 12,000–13,000 ft., are by no means immune from altitude symptoms on ascending to 19,000 ft. and have not proved superior to Europeans at altitudes over 25,000 ft.

Post-war British expeditions approaching the Himalayas through Nepal have, on the whole, dispensed with preliminary acclimatisation and gone straight up to 18,000 ft. or higher within a few days of reaching their main base at 13,000 ft. and have not come down again until after the assault. The experience gained on the Cho Oyu expedition was that such a policy reduces the chances of success in climbing peaks higher than 25,000 ft. because of its effect on the cohesion and efficiency of a climbing party. The less tolerant climbers, particularly newcomers, suffer fairly severely from altitude symptoms, and infections take their toll at a critical stage when every man is needed. The strain of climbing is greater, and altitude deterioration sets in at lower altitudes and is more severe, than in parties who have had more time in which to acclimatise. Finally, the effects of oxygen lack on the mind—the impairment of will and judgment and the lack of insight—are likely to be more dangerous in poorly acclimatised parties.

The plan adopted with success on the 1953 Everest expedition was to set aside a month for preliminary acclimatisation after the approach march, and to make several short visits to 18,000 ft., returning in the intervals to 13,000 ft. to rest. When the party finally went up to Western Cwm they were much fitter than the party on Cho Oyu and had lost on the average only 2 lb. in weight compared with 11 lb. over the same period the year before. They had also got over the stage of infections and remained free from illness on the mountain (apart from altitude symptoms).

As already mentioned a party led by Stobart spent six months in the Everest region in search of the "abominable snowman." Stobart reported that their acclimatisa-

tion at 16,000–18,000 ft. went on improving all the time they were there.

Mountaineering parties, however, seldom have more than three or four months at their disposal, and partial acclimatisation is as much as they can hope to achieve.

### Summary

The effects of altitude experienced on three Himalayan expeditions are described. Symptoms varied with individual susceptibility, previous experience, the stages of the ascent, and time spent at a given altitude. Lassitude, weakness, breathlessness, and retardation of thought and action are the principal effects and were always present over 18,000 ft. Acute mountain sickness was not seen, although isolated acute symptoms, such as headache and vomiting, were noted.

The physical findings on examination of men coming down from great heights were essentially normal, except that 3 men suffering from exhaustion had abnormally low blood-pressure (85–80/70–60 mm. Hg).

Physical deterioration eventually sets in above 20,000 ft. and is the more rapid and severe the greater the altitude. Partial adaptation, however, occurs initially at least up to 23,000 ft. In previous expeditions dehydration and lack of food have been important contributory factors in de erioration.

The mental effects of great altitude and their possible sequelæ are described in the light of the previous Everest expeditions from 1922 onwards.

The problem of how to achieve acclimatisation as quickly as possible is discussed.

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## ELECTROLYTE AND CIRCULATORY CHANGES IN TERMINAL LIVER FAILURE

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PATIENTS with liver disease in whom ascites has developed retain sodium avidly (Eisenmenger et al. 1950, Ricketts et al. 1951), and this has been related to increased activity of the mineralocorticoid hormone of the adrenal, aldosterone (Davis et al. 1953, Luetscher and Johnson 1954, Pechet et al. 1954). This hormone, however, cannot account for all the water and electrolyte disturbances found in liver failure, particularly when this is progressive and fatal. Although the serum-sodium level in cirrhotic patients with ascites is lowered it rarely falls below 130 m.eq. per litre. In the terminal stages, however, profound hyponatræmia may develop associated with oliguria and sometimes with azotæmia. These features may occur without gross ascites. In addition, many patients show conspicuous hypotension. We describe here nine patients showing these changes and the attempts made to correct the electrolyte disturbance and the hypotension.

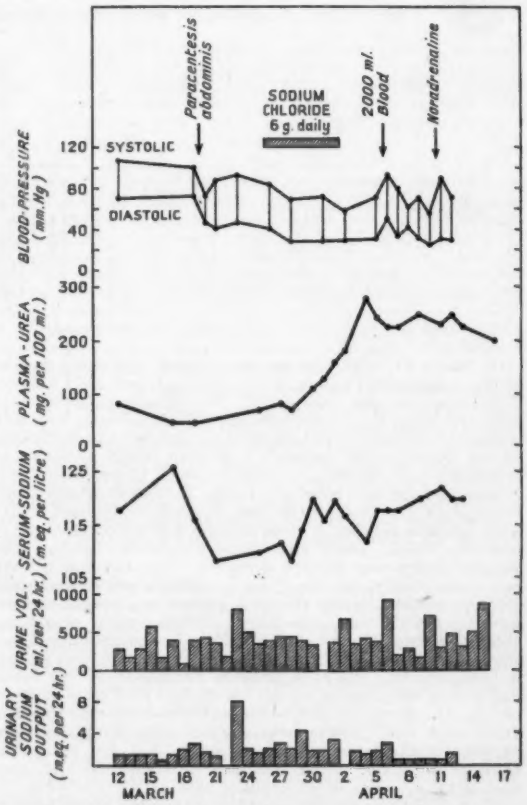


**Fig. 1.—Case 1. Changes in blood-pressure, serum-sodium and urea levels, urine volume, and sodium excretion.**

### Clinical Material

The nine patients were observed in Hammersmith Hospital during the last three years. Two suffered from acute or subacute virus hepatitis, four from portal cirrhosis associated with alcoholism, and three from portal or postnecrotic cirrhosis of unknown ætiology. The admission biochemical findings are shown in table I. The diagnosis in eight patients was confirmed at necropsy and in the ninth by needle liver biopsy. On admission to hospital they were treated by a standard low-sodium diet (less than 22 m.eq. sodium daily with 120 g. protein) (Atkinson et al. 1954). When necessary one paracentesis abdominis was performed within the first two weeks after admission to hospital. When the neurological changes associated with hepatic precoma (portal-systemic encephalopathy) were observed, dietary protein was reduced and chlortetracycline was usually given (Sherlock et al. 1954, 1956).

### Case-reports

**Case 1.**—A housewife, aged 52 (fig. 1). In December, 1954, anorexia was followed by jaundice with pale stools and dark urine. During the succeeding three months icterus lessened but vascular "spiders" appeared and there was spontaneous bruising. In January, 1955, there was a small melæna followed by œdema and ascites. There had been no previous jaundice, recent injections, contact with hepatitis, or alcoholism.

TABLE I—ADMISSION FINDINGS COMPARED WITH THOSE IN THE TERMINAL STATE

| Case no. | Diagnosis | Serum-bilirubin (mg. per 100 ml.) | | Serum-cholesterol (mg. per 100 ml.) | | Serum-albumin (g. per 100 ml.) | | Serum-sodium (m.eq. per litre) | | Serum-potassium (m.eq. per litre) | | Blood-urea (mg. per 100 ml.) | | B.P. (mm. Hg) | | Urine 24-hr. | | Hb (g. per 100 ml.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | Vol. (ml.) | Sodium (m.eq.) | |
| | | I | II | I | II | I | II | I | II | I | II | I | II | I | II | II | II | II |
| 1 | Subacute hepatitis | 2·6 | 14·4 | 153 | 87 | 2·1 | 1·8 | 118 | 120 | 4·4 | 4·8 | 84 | 200 | 120/70 | 70/30 | 350 | 2 | 11·1 |
| 2 | Acute hepatitis .. | 20·1 | 21·0 | 108 | 108 | 2·2 | 2·2 | 130 | 128 | 2·3 | 2·5 | 70 | 77 | 120/75 | 60/20 | 500 | 10 | 12·7 |
| 3 | Cirrhosis .. .. | 1·9 | .. | 146 | .. | 1·4 | .. | 118 | 125 | 3·9 | 4·2 | 19 | 43 | 100/60 | 50/30 | 450 | 5 | 10·2 |
| 4 | ,, .. .. | 3·0 | 3·7 | 105 | 95 | 2·9 | 1·8 | 127 | 104 | 3·1 | 5·3 | 43 | 120 | 120/80 | 90/20 | 400 | 5 | 15·6 |
| 5 | ,, .. .. | 4·3 | 10·6 | 238 | .. | 2·3 | 2·6 | 135 | 103 | 3·5 | 5·0 | 42 | 263 | 150/90 | 110/60 | 460 | 3 | 11·4 |
| 6 | ,, .. .. | 4·6 | 7·1 | 150 | 108 | 2·4 | 1·4 | 133 | 110 | 3·5 | 5·6 | 29 | 196 | 120/80 | 90/40 | 400 | 5 | 10·7 |
| 7 | ,, .. .. | 2·0 | .. | 149 | .. | 2·0 | 2·5 | 123 | 119 | 4·0 | .. | 25 | 68 | 125/70 | 100/60 | 300 | 2 | 11·0 |
| 8 | ,, .. .. | 7·6 | 3·9 | 200 | 120 | 2·7 | 1·5 | 133 | 120 | 3·4 | 3·2 | 24 | 88 | 120/80 | 90/40 | 360 | 5 | 12·4 |
| 9 | ,, .. .. | 12·0 | 16·0 | 193 | .. | 2·1 | .. | 130 | 117 | 3·0 | 2·2 | 19 | 78 | 150/110 | 80/50 | 320 | .. | 12·0 |

I, on admission. II, 2–4 days before death.

On March 11, 1955, she was drowsy with a flapping tremor of the outstretched hands, fetor hepaticus, and mild icterus. Œdema and ascites were gross. The clinical diagnosis was subacute hepatitis. Urine volume was persistently low and the urinary sodium output negligible, and these were unaffected by an injection of mersalyl. A week later paracentesis abdominis was started, but within twelve hours, when only 4 litres of fluid had been withdrawn, the blood-pressure had fallen from 120/70 to 70/45 mm. Hg, and forty-eight hours later, when a total of 9 litres of fluid had been removed, it was only 85/50. There were minor fluctuations but the subsequent course was steadily downhill. The blood-urea level rose continuously, but there was no albuminuria or abnormal urinary deposit. After the paracentesis the plasma-sodium level fell to 108 m.eq. per litre. Administration of sodium chloride did not alter the urine volume or sodium output but the patient became thirsty and more œdematous and gained weight (table II). The blood-pressure remained very low, being raised only temporarily by the transfusion of 4 pints of fresh blood. On April 7 a catheter was inserted into the superior vena cava and feeding was started with 40% dextrose, supplemented by parenteral vitamins and by potassium chloride 2 g. daily. There were now gross œdema of the legs and arms, episodes of alimentary bleeding, and stupor. A further blood-transfusion resulted in mental improvement, elevation of blood-pressure, and some increase in urinary output. On April 12 noradrenaline was given by continuous intravenous infusion; this increased the blood-pressure and urine volume, but the sodium output was not significantly changed (table III). The blood-pressure was maintained at a systolic pressure of 90–120 mm. Hg with noradrenaline. The amount of noradrenaline needed steadily rose, and it was continued until her death suddenly on April 22, 1955.

*Necropsy* showed recent alimentary bleeding, a shrunken liver with features of subacute hepatitis, and normal kidneys and suprarenal glands. There was pulmonary œdema.

**Case 2.**—A historian, aged 64 (fig. 2). This man died in hepatic coma thirty days after the onset of acute virus hepatitis. He was first seen five days before death, deeply jaundiced and drowsy. His skin and tongue suggested dehydration despite a small ascites and very slight sacral œdema. Treatment was instituted with intracaval dextrose and oral chlortetracycline, but the course was rapidly downhill with increasing coma, ascites, and œdema. The blood-pressure on admission was normal, but within two days the systolic pressure had fallen to 96 mm. Hg, and during the last forty-eight hours of life did not exceed 80. The blood-pressure was uninfluenced by hypertonic saline intravenously, and a continuous noradrenaline infusion in the terminal stages increased the blood-pressure for only a few hours. Urine volume fell and sodium output was negligible.

*Necropsy* revealed some altered blood in the distal ileum. The liver was wrinkled and weighed only 570 g. Histologically it showed almost complete lobular destruction without regeneration—the picture of fulminant virus hepatitis. The kidneys were essentially normal, and there was some pulmonary œdema.

**Case 3.**—A business executive, aged 57. In 1952 this patient, a long-standing spirit-drinker, was found to have a large liver, and liver biopsy showed portal cirrhosis with an excess of microscopically visible fat. In June, 1955, ascites developed, and abdominal paracenteses, each of 10 litres, were necessary every three weeks. On Sept. 8, 1955, he was icteric, drowsy, and disorientated, with feter hepaticus, tense ascites, and gross peripheral œdema. The serum-sodium level was very low, urine volume diminished, and urinary sodium output negligible. Deterioration was steady despite intracaval dextrose, and noradrenaline. The blood-pressure fell from 100/60 mm. Hg to unrecordable levels, and after a terminal vomit of altered blood he died on Sept. 14, 1955.

TABLE III—CASE 1: EFFECT OF INTRAVENOUS NORADRENALINE

| — | Time | Urine | | | | | B.P. (mm. Hg) |
|---|---|---|---|---|---|---|---|
| | | Vol. (ml.) | Sodium (m.eq.) | Potassium (m.eq.) | Chloride (m.eq.) | Urea (g.) | |
| Dextrose 40% | 9 A.M. to 1 P.M. | 40 | 0·2 | 1·0 | 0·16 | 0·5 | 80/40 |
| Dextrose 40% with noradrenaline 0·2 µg. per kg. per min. | 1–5 P.M. | 144 | 0·3 | 2·4 | 0·58 | 3·5 | 100/55 |

*Necropsy* revealed a portal cirrhosis with extensive œsophageal and upper gastric varices, one of which had ulcerated and contained recent thrombus in its depth. Blood was present only in the stomach, duodenum, and upper jejunum. The kidneys were macroscopically normal.

**Case 4.**—A grain merchant, aged 50. This patient, a heavy drinker of araq (an alcoholic beverage comparable in strength to gin), had hepatosplenomegaly, and had had gross ascites for five months. Dietary sodium restriction was started, and twice-weekly mersalyl was supplemented by ammonium chloride 3 g. daily. Paracentesis abdominis was needed three weeks later, and the course from this time was steadily downhill. The serum-sodium level fell, and urine volume

TABLE II—RESULTS THE DAY BEFORE AND DAY AFTER CONCLUSION OF SODIUM-CHLORIDE THERAPY

| Case no. | Sodium chloride | Before treatment | | | | | | After treatment | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Weight (kg.) | B.P. (mm. Hg) | Serum-sodium (m.eq. per litre) | Blood-urea (mg. per 100 ml.) | Urine vol., 24-hr. (ml.) | Urine-sodium (m.eq. per 24 hr.) | Weight (kg.) | B.P. (mm. Hg) | Serum-sodium (m.eq. per litre) | Blood-urea (mg. per 100 ml.) | Urine vol., 24-hr. (ml.) | Urine-sodium (m.eq. per 24 hr.) |
| 1 | 6 g. daily for 7 days .. | 59·7 | 80/40 | 110 | 75 | 300 | 1·5 | 64·95 | 60/30 | 117 | 180 | 250 | 1·5 |
| 2 | 400 ml. 5% I.V. in 8 hr. .. | .. | 60/40 | 125 | 70 | 475 | 10·0 | .. | 40/20 | 128 | 80 | 120 | 1·5 |
| 5 | 250 ml. 5% in 1 day, then 15 g. daily for 2 days .. | 62·3 | 125/70 | 124 | 140 | 420 | 2·0 | 64·5 | 110/70 | 126 | 205 | 520 | 3·0 |
| 8 | 500 ml. 5% in 12 hr. .. | .. | .. | 126 | 88 | .. | .. | .. | .. | 124 | 95 | .. | .. |

diminished. There was a terminal rapid rise in the blood-urea level. The blood-pressure fell during the last four days of life. The patient died in coma six weeks after admission. Necropsy was not performed.

**Case 5.**—A housewife, aged 68. This woman, with cirrhosis of unknown ætiology, was admitted on Jan. 26, 1954, with gross ascites and œdema up to the level of the waist. Abdominal paracentesis of 10 litres precipitated drowsiness and vomiting, with a falling serum-sodium level, a rapidly rising blood-urea level, and oliguria. The blood-pressure fell from 150/90 to 110/60 mm. Hg. A "low-salt syndrome" was considered possible, but hypertonic saline only increased the œdema and ascites. The patient died two weeks after the paracentesis, having had a mild terminal gastro-intestinal hæmorrhage.

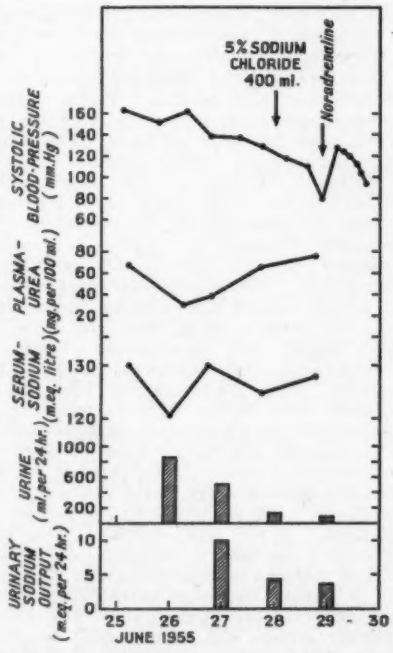


**Fig. 2.—Case 2. Changes in systolic blood-pressure, serum-sodium and urea levels, urine volume, and sodium output.**

At *necropsy* the liver was small and shrunken, with post-necrotic cirrhosis, but the kidneys were normal.

**Case 6.**—A clerk, aged 23. This young woman died five years after the onset of recurrent hepatitis. Eight months before death ascites and œdema developed, and these were controlled with difficulty by restriction of dietary sodium, administration of mersalyl and ammonium chloride, and an occasional paracentesis abdominis, the last being one month before her death. Her final admission was on June 29, 1954, and the course in hospital was complicated first by pneumonia and later by an *Escherichia coli* septicæmia. She became progressively more drowsy, and finally died with increasing œdema and ascites after three days of semicoma. The urinary sodium output was persistently low, and five days before death the serum-sodium level fell to 110 m.eq. per litre. The blood-urea level mounted steadily and the serum-albumin level fell.

*Necropsy* revealed postnecrotic cirrhosis. The suprarenal glands were hypertrophied, and histologically all the layers were well developed and apparently active. The kidneys were macroscopically normal but microscopically showed digitation of the glomerular tufts, and the primary convoluted tubules showed fine hyaline droplets. There was a great increase in plasma-cells. The whole picture was summed up as "immune kidney."

It is interesting that this patient during life showed very high serum γ-globulin levels, and that L.E. cells were identified in the blood.

**Case 7.**—A merchant navy officer, aged 52. In 1953 cirrhosis of the liver due to alcohol was diagnosed. On Sept. 4, 1955, he was mildly icteric with gross ascites, splenomegaly, and moderate peripheral œdema. Attempts to increase dietary protein by intragastric feeding resulted in drowsiness and disorientation, and this was aggravated by paracentesis abdominis on Sept. 13, the serum-sodium level falling and never rising significantly afterwards. On Oct. 4 stupor followed a large hæmatemesis, and he died on Oct. 13 after further gastro-intestinal hæmorrhage. The blood-pressure never fell below 100/70 mm. Hg until the day of death.

At *necropsy* the liver was small and showed portal cirrhosis. The kidneys were normal apart from two small pyelonephritic scars. There was a considerable amount of changed blood in the stomach, duodenum, and small intestine. A large, simple, gastric ulcer was present, but there was no definite evidence that this was the site of bleeding.

**Case 8.**—A clerk, aged 61. Cirrhosis of the liver of unknown ætiology was diagnosed in 1954. He was admitted on Feb. 16, 1956, with jaundice, disorientation, non-tense ascites, and ankle œdema. The course was steadily downhill with increasing confusion. The serum-sodium level fell, and on March 13 sodium and potassium were administered (table II); but this did not raise the serum-sodium level. He became breathless and increasingly œdematous with a fall in blood-pressure and died on March 15.

*Necropsy* showed postnecrotic cirrhosis of the liver with a very large portal-systemic collateral circulation. The kidneys were normal and the lungs œdematous.

**Case 9.**—A professional man, aged 56. In 1955 this patient, a heavy spirit drinker, developed jaundice, ascites, and œdema. On April 12, 1956, he was confused with gross "flapping" tremor, deep jaundice, and very slight ascites and œdema. He was treated first with high-protein feeding, but when mental symptoms increased this was replaced by intracaval 40% dextrose. Deterioration, however, was progressive, with deepening jaundice, coma, and a falling serum-sodium level. The blood-pressure fell three days before his death on April 26.

*Liver Function*

All the patients were clinically jaundiced, and in the majority worsening liver function was reflected in an increasing serum-bilirubin level. The fall in serum-albumin and total serum-cholesterol levels probably had a similar significance, for they were too great to be due to dilution in an increasing plasma-volume.

*Fluid and Electrolyte Changes*

All nine patients had clinically detectable ascites, although in only six did this necessitate paracentesis abdominis. In four patients (cases 1, 3, 4, 5) the terminal stages of the disease seemed to be initiated by the paracentesis, the serum-sodium level falling soon afterwards and never returning to the 130 m.eq. level. Death, however, did not occur until 27, 10, 25, and 14 days later. In case 6 the serum-sodium level did not fall until 20 days after the paracentesis, and deterioration could not be associated with the procedure. In case 7 the serum-sodium level was very low before paracentesis.

Serum-sodium levels, initially low, fell to values below 130 m.eq. per litre. Results have been compared with those found in seventeen other patients with hepatic cirrhosis and ascites who were treated similarly but who responded well and were able to leave hospital. In these patients the mean serum-sodium level was 136 m.eq. per litre (range 130–140). If serum values fall below 130 m.eq. the prognosis is poor.

The serum-potassium level sometimes rose moderately during the terminal stages. In seven patients the blood-urea level on admission was normal, but in two (cases 1 and 2) it was raised. Blood-urea values always increased during the terminal stages of the illness.

The urinary output fell continuously, although in the last few days of life incontinence prevented accurate measurement. The last 24-hour volume available never exceeded 500 ml. The daily urinary sodium output was always less than 10 m.eq. and usually less than 6 m.eq. The specific gravity of random urine samples exceeded 1020; there was no albuminuria or microscopic urinary abnormality.

In four patients sodium was administered either in cachets or intravenously in hypertonic solution (table II). In case 1 (fig. 1) 6 g. of sodium chloride was given daily for seven days without altering urine volume or sodium output; the sodium level rose from 110 to 120 m.eq., only to fall to 113 m.eq. within three days, and the blood-

urea level rose steadily; body-weight increased by about 5 kg., which closely corresponds to the weight of a volume of isotonic saline containing the 42 g. of added salt; the blood-pressure was uninfluenced. Similar results were obtained in the other three patients, although weighing was not always possible and urine samples could not always be obtained. Patients were allowed glucose drinks, which they took avidly, and clinical œdema increased. Cases 2 and 8 became dyspnœic and died within two days after the infusion was discontinued; at necropsy there was evidence of gross pulmonary œdema.

*Circulatory Changes*

Seven patients showed a profound drop in blood-pressure during the terminal stages of the illness (table I). The most remarkable was case 1, in whom the systolic pressure remained at 70–80 mm. Hg for twenty-three days, only rising when blood-transfusion or noradrenaline was given. In six others the systolic pressure was below 100 mm. Hg for at least three days before death. The pulse was regular and collapsing in type with a low diastolic pressure. The patients were not cyanosed. The hands were warm, while vascular "spiders" were bright red and pulsated vigorously. The jugular venous pressure was slightly raised and the heart clinically hyperactive. When venous blood was sampled from an anticubital vein it appeared bright red. In case 1 the catheter being used for parental glucose therapy was passed into the right ventricle; from a sample obtained from this chamber the calculated cardiac output was 12 litres per minute. A sample obtained from a right hepatic vein was only 30% saturated with oxygen, compared with the usual values of about 67% for hepatic-vein blood. Arterial oxygen saturation was 90%. The blood-pressure at this time was 78/30 mm. Hg.

Gastro-intestinal hæmorrhage occurred in six patients (cases 1, 2, 3, 5, 7, 9), but was terminal and the blood-pressure had fallen before this event. None of the nine patients had a hæmoglobin level lower than 10 g. per 100 ml., and anæmia was not thought to contribute significantly to the hyperdynamic circulation.

*Effect of Intravenous Noradrenaline*

In case 1 continuous intravenous noradrenaline increased urine volume three and a half times and urea output seven times, while sodium output was not significantly changed, and potassium output seemed to follow the change in urine volume (table III). Essentially similar results were recorded next day with double the dose of noradrenaline. Continuous administration of noradrenaline was then started with an initial dose of 0·3 μg. per kg. per min., and the systolic blood-pressure was maintained at a level of 90–120 mm. Hg. The twenty-four-hour urine output increased to more than 1 litre, the blood-urea level fell from 230 to 170 mg. per 100 ml., and the serum-sodium level rose slightly from 120 to 124 m.eq. per litre. The patient's mental state fluctuated in proportion to the height of the blood-pressure, while the œdema and ascites decreased appreciably. The dose of noradrenaline needed to maintain the blood-pressure rose steadily until she was receiving 2 μg. per kg. per min., but after ten days this failed to maintain blood-pressure and the patient died.

In case 2 noradrenaline raised the systolic blood-pressure from 40 to 90 mm. Hg but within twelve hours it had fallen again to 55 and he died four hours later. In case 3 noradrenaline increased the blood-pressure from 75/45 to 105/70 mm. Hg, but larger doses eventually failed and the patient died the next day.

## Discussion

The syndrome of portal systemic encephalopathy (hepatic precoma and coma) has been described in patients with almost all types of underlying liver disease (Sherlock et al. 1954). Similarly, the unfortunate terminal picture of hyponatræmia and hypotension may complicate most forms of hepatocellular disease and was seen with both subacute hepatitis and cirrhosis of the liver.

Low serum-sodium values are usual in cirrhotic patients with ascites and œdema. Values below 130 m.eq., however, are ominous and recovery has not been seen when levels fall below 125 m.eq. The mechanism of the hyponatræmia is very complex. Schroeder (1949) described a condition of renal failure with a low extracellular water, often called the "low-salt syndrome," caused by excessive sodium restriction combined with measures designed to deplete body-sodium such as diuretics, exchange resins, and removal of œdema or ascitic fluid. This syndrome is characterised by lowering of urinary volume and chlorides, low serum sodium and chloride levels, a rising blood-urea level, rapid gain in body-weight, and hypotension. There is drowsiness, weakness, mental confusion, nausea, and muscular cramps. This syndrome has been reported in two patients with hepatic cirrhosis receiving a low-sodium diet and having paracenteses (Nelson et al. 1951). Relief, with diuresis and rise in blood-pressure, follows intravenous administration of hypertonic saline, and as our patients showed many of the features of the "low-salt syndrome" this led to the trial of saline therapy in four of them. It was clear, however, that, given an unrestricted water intake, the additional sodium was completely retained in isotonic dilution with further increase of an already expanded extracellular volume. In two patients the hypertonic saline was followed by pulmonary œdema and even seemed to accelerate death. It should be emphasised that three of the present patients had never received a low-sodium diet, three had never had a paracentesis, and in another the paracentesis was unrelated to the terminal state.

Talso et al. (1956a) have shown that the total exchangeable sodium is increased in some patients with hyponatræmia although total body-water may be normal or only slightly increased. They concluded that the apparent hyponatræmia might be due to redistribution of sodium, a relatively greater fraction occurring in the intracellular compartment. This view is supported by Laragh (1954), who showed that large doses of potassium chloride raised the plasma-sodium level in hyponatræmic patients without altering the total body-sodium content, and this was possibly due to release of sodium from cells in exchange for the administered potassium. Electrolyte analyses of muscle biopsies from patients with liver disease, however, have failed to show any alteration supporting the postulated redistribution of sodium (Strub et al. 1955). Bones and connective tissue have been suggested as the site of this exchange but have not so far been analysed (Talso et al. 1956b). Methods for measuring intracellular electrolytes are at present unreliable and final assessment of this interesting hypothesis must await better techniques.

Chronic hyponatræmia is found in chronic debilitating or wasting diseases such as advanced heart-failure, tuberculosis, or cancer. This is associated with a primary decrease in intracellular osmolarity, which is reflected in extracellular osmolarity (Welt et al. 1950). This dilution is effected either by retention of water or by excretion of sodium chloride. Patients in terminal liver disease are certainly not excreting sodium and must therefore be retaining water. It is conceivable that the dilution might be effected by the antidiuretic hormone, the osmoreceptors controlling its output being set at a lower level, although there is little evidence that this is so. In the present state of knowledge the term "dilution hyponatræmia" should be avoided, since it is uncertain how much the low serum-sodium is due to an expanded extracellular space (dilution) and how much to redistribution of sodium between extracellular and intracellular compartments.

Aldosterone has been recovered in increased amounts from the urine of cirrhotic patients forming ascites (Luetscher and Johnson 1954). This hormone, however, has little effect on water metabolism and excesses would not explain the dilution phenomena observed in patients with terminal liver disease.

The mechanism of the terminal azotæmia is complex. It is unrelated to organic changes in the kidney, for at necropsy the microscopic appearance of the kidneys was little changed and during life the kidney concentrated well and there was no albuminuria or microscopic abnormality in the urinary deposit. The azotæmia could be associated with the hypotension and renal circulatory failure and with the presence of blood in the intestine. This, however, cannot be the whole explanation, for in two patients the blood-urea level was raised before the development of either hypotension or gastro-intestinal hæmorrhage. It is not clear whether the terminal rise in blood-urea level represents purely a circulatory deficiency or some more fundamental metabolic upset.

Warm, dry hands, hypotension, and a soft, full pulse are common features of decompensated liver disease, and the cardiac output is increased in patients with cirrhosis of the liver (Kowalski and Abelmann 1953). Peripheral venous blood is highly oxygenated (Silverstein 1956). The hyperdynamic circulation could not be related to chronic anæmia, for the hypotension preceded the terminal gastro-intestinal hæmorrhage and the patients were not severely anæmic. The low blood-pressure with increased cardiac output suggests vasodilatation, but the mechanism of this is uncertain. Shorr (1947) and co-workers invoked a vasodilator material (V.D.M.) which is released in states of liver damage. Although the significance of V.D.M. is disputed, it is clear that in liver failure there is profound vasodilatation with a hyperdynamic circulation. This increased blood-flow is not to the brain, for the level of consciousness is correlated with the blood-pressure; neither does it seem to be to the kidney, for the azotæmia must be in part circulatory. The low oxygen saturation of hepatic venous blood in case 1 suggests that hepatic blood-flow is reduced. It is known that the liver does not share in the increased cardiac output of other hyperdynamic states, such as thyrotoxicosis (Myers et al. 1950). Indeed, in the presence of hypotension liver blood-flow is reduced and this may contribute to the liver failure. This was the rationale for raising systemic blood-pressure. Noradrenaline was chosen because it is a peripheral constrictor with little effect either on the splanchnic circulation or on cardiac output (Bearn et al. 1951). This substance had a dramatic though temporary effect in improving the state of consciousness and increasing urinary volume, and is worth further trial. Blood-transfusion may be similarly effective.

A fatal outcome can be expected in patients with hepatocellular disease, ascites, and œdema who have deepening jaundice, a falling serum-sodium level and urine output, and a systolic blood-pressure below 100 mm. Hg. The neuropsychiatric changes of impending hepatic coma are constant accompaniments. Attempts to raise artificially the serum-sodium level are useless, and noradrenaline and blood-transfusions, together with the measures for hepatic coma, should be employed. The outcome, however, is usually fatal.

### Summary

Nine patients in severe liver failure due to hepatic cirrhosis or virus hepatitis developed profound hyponatræmia, often with azotæmia. In six patients depression of serum-sodium values was initiated or accelerated by paracentesis abdominis. In four patients hyponatræmia could not be corrected by administering salt. The patients became thirsty and developed further œdema, and in the two who were weighed there was a gain. In two patients therapy seemed to hasten death.

Eight patients showed hypotension with evidence of gross peripheral vasodilatation. In three patients intravenous noradrenaline increased the blood-pressure and urinary volume. The patients eventually proved unresponsive to increasing doses of the drug.

The changes were independent of organic renal disease and of gastro-intestinal hæmorrhage.

In patients with liver disease serum-sodium levels below 130 m.eq. per litre must be regarded as serious, and, if below 125 m.eq. per litre, ominous.

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## PAPER ELECTROPHORESIS OF SERUM-PROTEINS IN HEPATOBILIARY DISEASE

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WE have investigated the value of paper electrophoresis in 100 cases of hepatic and biliary disease referred to certain units of the Royal Infirmary of Edinburgh in eighteen months in 1954–56.

### Methods

Electrophoresis of serum-proteins on filter-paper was done as previously described (Owen 1956). The relative concentrations of the five main serum-protein fractions were determined and, from the results, each fraction was computed as a percentage of the total amount of protein. The actual level of each fraction was not considered, because the mean level of total protein does not vary significantly in hepatobiliary diseases; hence percentages give the same information as do actual levels (Popper et al. 1951).

The range of normal values was obtained by analysing sera from healthy laboratory personnel and from healthy blood-donors; no difference was observed in the results from these two groups.

As an aid to the establishment of a diagnosis the following tests were also made as a minimum in each case: determination of serum-bilirubin level (Haslewood

TABLE I—ULTIMATE DIAGNOSIS IN 100 PATIENTS WITH HEPATOBILIARY DISEASE

| Diagnosis | No. of patients |
|---|---|
| Infective hepatitis* | 21 |
| Extrahepatic neoplasm | 13 |
| Stone in common bile-duct | 22 |
| Cholecystitis† | 9 |
| Diffuse hepatic fibrosis (cirrhosis of liver)‡ | 12 |
| "Precirrhotic hepatitis"§ | 4 |
| Cardiac cirrhosis | 7 |
| Secondary neoplasm in liver | 5 |
| Reticulosis of liver | 3 |
| Acute hepatic necrosis | 2 |
| "Cholangiolitic cirrhosis"‖ | 2 |
| Total | 100 |

* Includes one case of chlorpromazine hepatitis.
† Acute or chronic cholecystitis with or without stones, but with no evidence of obstruction of common duct at laparotomy.
‡ Includes 2 cases with associated primary hepatoma.
§ Chronic alcoholics with obvious hepatomegaly but without the stigmata of actual cirrhosis.
‖ Intrahepatic biliary obstruction, in 1 case associated with xanthomatosis.

and King 1937), alkaline-phosphatase level (King 1951), cephalin-cholesterol flocculation (C.C.F.T.) (Hanger 1939). The serum-protein level was determined by a biuret method (Gornall et al. 1949).

## Results

The ultimate diagnosis in each patient was satisfactorily established (table I).

*Infective Hepatitis (21 cases)*

Table II shows that usually the levels of total protein and $\alpha_1$ and $\alpha_2$ globulins were normal, whereas those of $\beta$ and $\gamma$ globulins were slightly raised, and that of albumin lowered. With the possible exception of the normal $\alpha_2$-globulin level (see below), it is clear that this general trend is insufficiently distinguished to be of much diagnostic value, especially when considered in relation to the high proportion of helpful results obtained from the C.C.F.T. and the alkaline-phosphatase level (Cameron and Robertson 1952).

From the prognostic point of view, however, valuable information can be obtained, as is illustrated by clinical subdivision of the 21 cases as follows:

*Group A (10 cases):* "ordinary" cases with short duration of jaundice and rapid complete clinical cure.

*Group B (5 cases):* cases with ultimate clinical cure, but in which anxiety existed for a time because of certain clinical features—long-continued jaundice, persistent hepatomegaly, and a tendency to relapse.

*Group C (6 cases):* cases with unfavourable clinical features as in group B and in which follow-up has shown a steady progression to postinfective-hepatitis cirrhosis. 5 of these patients at the time of writing are seriously ill, and 1 has died.

Table III shows the $\gamma$-globulin percentage for each case in the three groups. With the exception of 1 case in each group, it is seen that a $\gamma$-globulin percentage of 40 or more indicated an unfavourable prognosis. Conversely, in the group-B cases with potentially grave clinical features a percentage of less than 40 (1 exception) was in keeping with the ultimate clinical cure. In paper electrophoresis we thus have a much more sensitive index to prognosis than in the C.C.F.T., which was uniformly +4 in all of the cases in groups B and C.

*Extrahepatic Neoplasm and Stone in Common Bile-duct (35 cases)*

It is convenient to consider those two groups together because in both the findings were practically identical, consisting of a relatively normal total serum-protein, a lowered serum-albumin, and more or less proportionally raised levels of the globulin fractions. In comparison with the findings in infective hepatitis, there is only one significant difference. Of the 35 cases with extrahepatic biliary obstruction 10 showed an $\alpha_2$-globulin percentage of 12 or more, whereas all of the 21 cases with infective hepatitis showed an $\alpha_2$-globulin percentage of 11 or less. This is of potential value in differentiating extrahepatic obstructive jaundice from hepatogenous jaundice.

One special point in relation to extrahepatic biliary obstruction requires mention. As has been noted above in infective hepatitis, severe and continuing liver damage is manifested electrophoretically by a $\gamma$-globulin percentage of more than 40. Only 1 of our 35 cases with extrahepatic obstruction showed a percentage of more than 40, this being in a female patient with a stone in the common bile-duct. At operation severe obstructive biliary cirrhosis was found, and the patient died soon afterwards in cholæmia. This finding suggests that the estimation of $\gamma$-globulin in patients with extrahepatic obstruction may be of value in the preoperative assessment of liver function.

TABLE III—$\gamma$-GLOBULIN PERCENTAGE (NORMAL 10–21) IN INFECTIVE HEPATITIS SUBDIVIDED CLINICALLY INTO GROUPS A, B, AND C

| Group A (10 cases) | Group B (5 cases) | Group C (6 cases) |
|---|---|---|
| 12 | 19 | 35 |
| 13 | 20 | 42 |
| 16 | 23 | 43 |
| 18 | 27 | 49 |
| 19 | 45 | 55 |
| 19 | .. | 56 |
| 23 | .. | .. |
| 25 | .. | .. |
| 30 | .. | .. |
| 44 | .. | .. |
| Mean 21·9 | 26·8 | 46·6 |

*Cholecystitis (9 cases)*

This group was characterised clinically by the presence of acute or chronic inflammation of the gall-bladder with or without stones. It differed from the previous group in that obstruction of the common bile-duct was absent.

TABLE II—SERUM-PROTEIN LEVELS IN PATIENTS WITH HEPATOBILIARY DISEASE

(The results are expressed as means to the nearest whole number, with the range (±2 S.D.) for normals only; the ranges in each diagnostic category were never less than the corresponding value in normals)

| Diagnosis | No. of cases | Total protein (g. per 100 ml.) | Albumin (%) | Globulin (%) | | | |
|---|---|---|---|---|---|---|---|
| | | | | $\alpha_1$ | $\alpha_2$ | $\beta$ | $\gamma$ |
| Normal | 34 | 7·0 (5·6–8·4) | 65 (57–72) | 5 (2–8) | 6 (3–9) | 9 (5–14) | 15 (10–21) |
| Infective hepatitis | 21 | 7·1 | 53 | 5 | 7 | 13 | 22 |
| Extrahepatic neoplasm | 13 | 6·3 | 43 | 6 | 11 | 16 | 23 |
| Stone in common bile-duct | 22 | 6·4 | 46 | 6 | 10 | 12 | 25 |
| Cholecystitis | 9 | 6·7 | 50 | 6 | 10 | 12 | 23 |
| Diffuse hepatic fibrosis | 12 | 6·3 | 31 | 6 | 6 | 9 | 47 |
| Precirrhotic hepatitis | 4 | 7·3 | 56 | 5 | 9 | 11 | 20 |
| Cardiac cirrhosis | 7 | 6·1 | 49 | 7 | 10 | 15 | 20 |
| Secondary neoplasm in liver | 5 | 5·8 | 46 | 7 | 12 | 12 | 23 |
| Reticulosis in liver | 3 | 5·3 | 51 | 8 | 10 | 11 | 20 |
| Acute hepatic necrosis | 2 | 6·7 | 49 | 3 | 3 | 6 | 41 |
| "Cholangiolitic cirrhosis" | 2 | 6·8 | 40 | 6 | 9 | 12 | 34 |

TABLE IV—ALBUMIN AND γ-GLOBULIN PERCENTAGES IN DIFFUSE HEPATIC FIBROSIS

| Case no. | Albumin (normal 57–72) | γ-globulin (normal 10–21) |
|---|---|---|
| 1 | 28 | 42 |
| 2 | 43 | 43 |
| 3 | 39 | 38 |
| 4 | 37 | 35 |
| 5 | 24 | 60 |
| 6 | 10 | 77 |
| 7 | 28 | 52 |
| 8 | 35 | 51 |
| 9 | 35 | 47 |
| 10 | 26 | 42 |
| 11 | 40 | 33 |
| 12 | 26 | 45 |
| Mean | 31 | 47 |

In such patients jaundice is absent or slight, and the routine biochemical tests show little or no abnormality. Table II shows that the electrophoretic pattern was usually identical with those patterns obtained in cases of obstruction of the common bile-duct by either stone or neoplasm. It is clear that paper electrophoresis has nothing to add in the study of those cases.

*Diffuse Hepatic Fibrosis (12 cases)*

The patients in this group showed all or several of the stigmata of cirrhosis of the liver, including hepatomegaly, portal hypertension, ascites, and spider nævi. The C.C.F.T. was uniformly +4. The electrophoretic pattern was not only grossly abnormal, with a much lowered serum-albumin level and a much raised γ-globulin level but also strikingly uniform in all 12 cases (table IV). The figures for total protein and the other globulin fractions were normal. In no other group was such consistency of results observed. Two patients with associated primary hepatoma had patterns similar to the 10 others.

"*Precirrhotic Hepatitis*" (*4 cases*)

For this group we have used a designation about which there is some dispute. Clinically, the picture was of chronic alcoholism with distinct hepatomegaly. The C.C.F.T. results were respectively negative, negative, +1, and +3. The electrophoretic pattern was within normal limits in 3; in the fourth, with C.C.F.T. +1, there was a slight decrease in albumin with a slight increase in γ-globulin. It is clear that early alcoholic damage to the liver is not reflected by appreciable change in electrophoretic pattern.

*Cardiac Cirrhosis (7 cases)*

As is usual in such cases, the C.C.F.T. was either negative or at most +1. The electrophoretic pattern showed no specific change.

*Secondary Neoplasm in Liver (5 cases)*

This group is of some importance because the hepatomegaly and ascites may sometimes cause confusion with cirrhosis of the liver. Electrophoretically there was a distinct difference in the two conditions. In secondary neoplasm the γ-globulin percentage was 30 or less, whereas in cirrhosis it was 33 or more. Further, in secondary neoplasm the $\alpha_2$ percentage tended to be high (mean 12%), whereas in cirrhosis it was consistently normal (mean 6%).

*Reticulosis in Liver (3 cases)*

In this group there was diffuse infiltration of the liver by a reticulotic process. The electrophoretic pattern showed no specific change.

*Acute Hepatic Necrosis (2 cases)*

In both cases there was a typical clinical picture with rapidly fatal course. Electrophoretically there was abnormality of all the fractions—a decreased amount of albumin, α-globulin, and β-globulin, and an increased amount of γ-globulin.

"*Cholangiolitic Cirrhosis*" (*2 cases*)

In both cases there was long-continued jaundice from intrahepatic biliary obstruction (extrahepatic obstruction had been excluded by exploratory laparatomy). In 1 case there was severe cutaneous xanthomatosis. As might be expected, the electrophoretic pattern was that of moderately severe cirrhosis—decreased albumin and increased γ-globulin. In 1 case, despite electrophoretic evidence of impairment of the liver, the C.C.F.T. was negative, this being presumably an example of the forced negativity of this flocculation test in the presence of biliary obstruction. The electrophoretic changes obviously reflect the grave prognosis in those 2 patients.

## Discussion

It is convenient to consider first the $\alpha_1$-, $\alpha_2$-, and β-globulin fractions. We have found, like Flynn (1954), that all three are reduced in acute hepatic necrosis, thus confirming what is usually a clinically evident diagnosis. The $\alpha_2$-globulin fraction is considerably increased in some cases of extrahepatic biliary obstruction and in cases of secondary hepatic neoplasm. Occasionally this may be of diagnostic significance (see below). It is most important to note that paper electrophoresis, in contrast to the classical Tiselius method, does not record the increase in the β-globulin fraction due to lipoprotein described by Longsworth et al. (1939), Kunkel and Ahrens (1949), Sterling and Ricketts (1949), Popper et al. (1951), Brante (1952), Mackay et al. (1954), and McQueen et al. (1954) in the jaundice of extrahepatic biliary obstruction and of the "obstructive" phase in infective hepatitis. This is a possible disadvantage of paper electrophoresis.

The next point is made at the risk of over-simplification. Table II shows that the amount of total protein deviates little from normal in all diagnostic groups (Popper et al. 1951). Further, the sum of the $\alpha_1$-, $\alpha_2$-, and β-globulin fractions constitutes only a relatively small percentage of the total protein. It therefore follows that, in terms of percentages, the remaining fractions—albumin and γ-globulin—vary inversely with each other. We have found it convenient in the remainder of this discussion to consider mainly the γ-globulin percentage, so avoiding reference to two dependent variables.

A striking increase in γ-globulin takes place in diffuse hepatic fibrosis (Martin 1949, Ricketts et al. 1949, Hartmann and Steinebach 1950, Whitman et al. 1950, Franklin et al. 1951, Knedel 1951, Brante 1952, Church and Blackburn 1954, Mackay et al. 1954, McQueen et al. 1954). We have confirmed this finding; in our 12 cases the mean γ-globulin percentage was 47. From the diagnostic point of view, however, it cannot be said that paper electrophoresis, despite the gross nature of the abnormality, is an essential investigation. The diagnosis in the present 12 cases was not in appreciable doubt after the application of more usual methods of investigation. Further, an increased γ-globulin percentage is also found in other conditions—e.g., collagen disease. Paper electrophoresis can be regarded in most cases as a confirmatory test. In some cases the increased γ-globulin, together with a normal $\alpha_2$-globulin fraction, helps in differentiating diffuse hepatic fibrosis from secondary hepatic neoplasm, in which there tends to be a normal γ-globulin fraction with an increased $\alpha_2$-globulin fraction (Seibert et al. 1947, Rafsky et al. 1950, Kay 1954). We cannot comment on the prognostic value of electrophoresis in cirrhosis, because of insufficient follow-up data.

On the other hand, the assessment of prognosis in infective hepatitis is greatly facilitated by study of the γ-globulin percentage, which tends to rise with increasing hepatocellular damage (Ricketts and Sterling 1949, Hartmann and Steinebach 1950, Viollier 1951, Church

and Blackburn 1954). We have shown that patients with one or more potentially unfavourable features—e.g., long-continued jaundice, relapses, persistent hepatomegaly, and persistently abnormal flocculation tests—will nevertheless do well, provided that the γ-globulin percentage is normal or only slightly increased. On the other hand, an increased γ-globulin percentage is a most unfavourable finding. The management of this difficult group of patients can be worked out on the basis of electrophoretic findings, which in the presence of considerable hepatic damage, are a more sensitive index of function than the commonly used flocculation tests.

It is disappointing to record that paper electrophoresis is of limited value in differentiating hepatogenous jaundice from jaundice due to extrahepatic biliary obstruction. Charbonnier (1954), using the Tiselius method, reported that an $\alpha_2$-globulin percentage of more than 11 indicated extrahepatic biliary obstruction. Though it is true that in our series an $\alpha_2$-globulin percentage of 12 or more occurred only in cases with extrahepatic biliary obstruction, 8 of the 10 cases with this finding already showed unequivocal evidence of extrahepatic obstruction in the form of a negative C.C.F.T. with an alkaline-phosphatase level of more than 30 units per 100 ml. Hence in only 2 of 56 cases (35 extrahepatic obstruction, 21 hepatogenous jaundice) could the $\alpha_2$-globulin percentage be considered of important diagnostic value.

At this point it is appropriate to refer to the problem of assessing liver function in patients with extrahepatic biliary obstruction, especially when this is of some duration and likely to be associated with obstructive biliary cirrhosis. It is well known (Ducci 1950) that the results of flocculation tests tend to be unreliable in those circumstances since, despite impaired liver function, they may be forced into normality by the influence of the obstruction. The bromsulphalein-retention test is also difficult to interpret in the presence of biliary obstruction (Burnett 1954). In these days of early exploratory laparotomy in suspected extrahepatic obstruction no single series of cases is likely to include more than a few in which obstruction has been prolonged; and so it is in our series. Clearly, therefore, our experience of electrophoresis in this problem is limited, but we suggest that the surgeon may find it helpful in preoperative assessment of liver function. As might be expected, an increased γ-globulin fraction is a warning that all is not well, and that a two-stage operation with preliminary biliary drainage is possibly required.

Little need be said about electrophoresis in cardiac cirrhosis and "precirrhotic hepatitis." In both conditions the flocculation tests tend to be normal or only slightly abnormal. We have found that the electrophoretic pattern is also little disturbed if at all. Ricketts et al. (1950) recorded a similar finding in a study of electrophoresis in asymptomatic or latent portal cirrhosis. It therefore seems that electrophoresis is incapable of detecting mild degrees of hepatic damage.

It is relevant at this point to mention other biochemical tests which provide information roughly comparable to that obtained by paper electrophoresis, and which are more easily performed. Church and Blackburn (1954) and Discombe et al. (1954) report that the results of the zinc-sulphate turbidity test correlate so well with γ-globulin values that separate electrophoretic estimation of the γ-globulin fraction is unnecessary. At the same time, Church and Blackburn (1954) refer to exceptions, especially in cases of cirrhosis; and de la Huerga et al. (1950) did not find such a close correlation. The latter workers found a closer correlation with the results of the ammonium-sulphate turbidity test. We have little personal experience of the correlation of those tests with γ-globulin levels determined electrophoretically. Obviously, further investigation on this controversial problem is indicated. In the meantime it is certain that paper electrophoresis provides a reliable estimation not only of the γ-globulin level but also (although this is of less practical importance) of the other globulin fractions and of albumin.

In conclusion we must try to answer the question whether or not paper electrophoresis is of practical value to the clinician in his assessment of patients with hepatobiliary disease, while keeping in mind that, from the point of view of the biochemist, this method of investigation is undoubtedly time-consuming. We have shown clearly that paper electrophoresis can in no way be regarded as a substitute for what we have called the routine biochemical tests. In certain circumstances discussed above, however, it can provide information related to diagnosis or to prognosis beyond that obtained by the routine tests. The clinician should limit his requests for paper electrophoresis to patients presenting a clear need for it. In this way he will coöperate with the biochemist in making maximal use of an occasionally valuable test with the minimum of laboratory effort.

## Summary and Conclusions

Paper electrophoresis of serum-proteins was done in 100 cases of hepatobiliary disease referred to hospital.

Paper electrophoresis cannot be regarded as a substitute for the biochemical tests at present in common use for the routine assessment of patients with hepatobiliary disease.

In certain circumstances, however, it can supply additional information of great importance to the clinician: (1) assessment of prognosis in patients with infective hepatitis who show potentially unfavourable clinical features; (2) confirmation of diagnosis in patients with diffuse hepatic fibrosis, especially when there is a problem in differentiation from secondary hepatic neoplasm in a patient with ascites; and (3) preoperative assessment of liver function in patients with extrahepatic biliary obstruction in which other biochemical tests of liver function tend to be unreliable.

Paper electrophoresis is of no value in the detection of early impairment of liver function, and only of very occasional value in the differential diagnosis between hepatogenous jaundice and jaundice due to extrahepatic obstruction. In certain other conditions—e.g., acute hepatic necrosis—electrophoretic findings are of interest but of little practical importance.

We wish to thank the physicians and surgeons of the Royal Infirmary, Edinburgh, for permission to investigate patients under their care; Dr. J. D. S. Cameron and Dr. C. P. Stewart for helpful criticism; Miss Muriel Paterson, Miss Hélène Roulet, and Miss Frances Taylor for technical assistance; and the Scottish Hospitals Endowment Research Trust for providing a grant which enabled Miss Roulet to take part in this investigation.

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# OXYTOCIC AND ANTIDIURETIC ACTIVITY IN BLOOD FROM THE INTERNAL JUGULAR VEIN IN MAN

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FEW attempts have been made to detect oxytocin in body-fluids in man, and there is in fact no direct evidence that this hormone is secreted by the human neurohypophysis. Nor is it known if, in response to different stimuli, oxytocin and antidiuretic hormone (A.D.H.) are released in constant ratio or independently. The most direct approach to problems of this type is to assay both hormones in single specimens of blood under different physiological and experimental conditions.

By a modification of Melville's method (Melville 1937) Bisset and Walker (1954) obtained concentrated extracts of both oxytocin and A.D.H. from rat blood. This method has now been applied to man.

A preliminary experiment was made to determine if it was possible to detect antidiuretic activity in blood from the median cubital vein during stimulation of the neurohypophysis. Blood was collected from two subjects in whom a water diuresis had been almost completely inhibited by smoking. The assay of concentrated extracts against pituitary (posterior lobe) extract (P.P.L.E.) in a highly sensitive preparation revealed less than 0·003 mU per ml.

Ginsburg and Heller (1953) have shown that the half-life of vasopressin in rat blood is only 0·85 minute. During the intracarotid infusion of hypertonic saline solution in dogs Ames et al. (1950) were unable to detect antidiuretic activity in blood from the femoral vein, although A.D.H. was detected in blood from the internal jugular vein at a concentration of 0·5 mU per ml.

To achieve detectable levels in man, we obtained specimens of blood from the internal jugular veins of patients undergoing surgical operations, and assayed extracts for both oxytocic and antidiuretic activity. In control experiments P.P.L.E. was added to blood and extracted to estimate the percentage recovered.

DR. OWEN, DR. ROBERTSON: REFERENCES—*continued*

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## Methods

### *Internal Jugular Venepuncture*

This is a standard procedure for infants (Bayliss 1954). A method for obtaining blood from the jugular bulb was described by Myerson et al. (1927). Logan et al. (1947) took blood from this site and also from the lower part of the jugular vein but did not describe their technique.

The patient lies with a head-down tilt to maintain filling of the vein. The carotid artery is palpated about the middle of the neck, and a no. 1 needle attached to a siliconed all-glass syringe is introduced at the anterior border of the sterno-mastoid muscle and directed immediately lateral to the carotid artery and upwards at an angle of 45° to the skin. Suction is maintained on the piston, and blood flows freely into the syringe at a depth of about an inch.

No complications developed except a small hæmatoma on one occasion in a thin person.

### *Preparation and Assay of Extracts*

Each specimen of blood, after its volume was noted, was delivered from the syringe into a polyethylene beaker containing 50 ml. of 80% ethyl alcohol (*v/v*) acidified with a few drops of normal sulphuric acid. In the laboratory the volume of ethyl alcohol was made up to nine times that of the blood, and a further quantity of normal sulphuric acid was added until the mixture became blue to Congo-red. Extracts were then prepared and assayed by the methods described by Bisset and Walker (1954).

Two stages are involved in the extraction. In stage 1, the precipitated plasma-proteins are removed by centrifuging, and the supernatant alcohol is concentrated by distillation in vacuo to about a tenth of the original volume. In stage 2, further concentration is obtained by allowing the residue to stand overnight in a petri dish. In the present investigation, owing to the small amounts of activity present, the residues were usually placed overnight in an oven at 40°C to ensure evaporation to dryness. The dry residues were then taken up in distilled water and dialysed for 45 minutes.

Oxytocic activity was assayed by the method of Holton (1948) on isolated rat uterus; a specimen of each extract was tested with sodium thioglycollate to determine if activity was abolished (Van Dyke et al. 1942) (fig. 1).

Antidiuretic activity was assayed by the method of Ames and Van Dyke (1952) in which, it should be noted, injections are given intravenously into rats under ethyl-alcohol anæsthesia (fig. 2). Urine was collected at intervals of 5 minutes, and the percentage inhibition of urine flow (I) was derived from the following expression

$$I = \frac{(2a-b)}{2a} \times 100$$

where a = volume of urine excreted in the period immediately preceding the injection and b = the total volume excreted during the second and third periods following the injection; the first period after the injection is ignored (Pardoe 1954). Wherever possible a two-and-two assay procedure was used.

The standard used for both oxytocic and antidiuretic assays was P.P.L.E. ('Pituitrin,' Parke, Davis & Co. Ltd.).

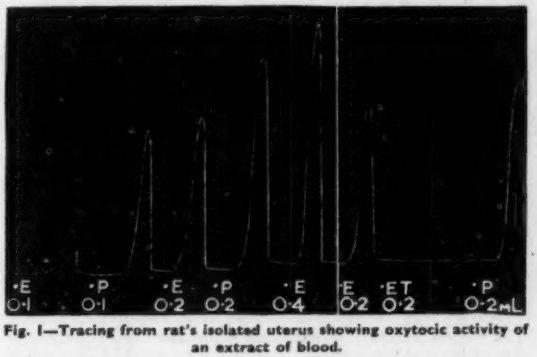


**Fig. 1—Tracing from rat's isolated uterus showing oxytocic activity of an extract of blood.**

Volume of organ bath 3·5 ml.; volume of blood 9·5 ml.; volume of extract (E) 2·5 ml.; ET, E treated with 0·01 M sodium thioglycollate; P, P.P.L.E. 10 mU per ml.

## Results

### *Assay of Endogenous Oxytocic and Antidiuretic Activity in Blood*

The results of assays of oxytocic and antidiuretic activity in blood obtained from eleven patients at operation are shown in table I. The blood was withdrawn from the internal jugular vein within 5–20 minutes after the induction of anæsthesia. Details are given of the indications for surgery and of drugs used for inducing and maintaining anæsthesia. The figures in the table are not corrected for loss of activity in the preparation of the extracts.

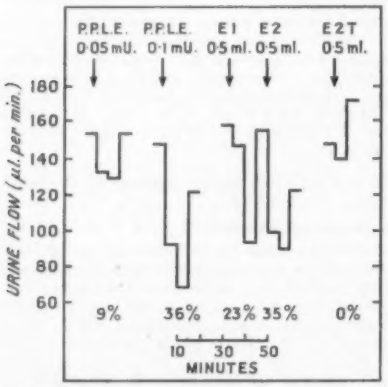


**Fig. 2—Urine flow of a rat under ethyl-alcohol anæsthesia, showing antidiuretic activity of extracts of blood.**

All injections were given intravenously; 25 ml. of blood was obtained from case 7 and divided into two equal portions: the first was concentrated to 1·7 ml. (extract E1); the second, to which 0·5 mU of P.P.L.E. was added, was concentrated to 2·15 ml. (extract E2). E2T=E2 treated with 0·01 M sodium thioglycollate. Below response to each injection is given percentage inhibition of urine flow.

Nine extracts were tested for oxytocic activity; the mean concentration in terms of P.P.L.E. was 1·2 (S.E. ± 0·26) mU per ml. A typical experiment is illustrated in fig. 1. In six cases activity was abolished by treatment with sodium thioglycollate. In cases 5 and 10 no difference was detected before and after treatment with thioglycollate, and zero results are recorded, although it is doubtful if, especially in the presence of interfering substances, concentrations of oxytocin below about 1 mU per ml. are detectable. In case 6, in which activity was reduced but not abolished, the residual activity was deducted from the total.

All the extracts were tested for antidiuretic activity; this was detected in only four cases. The concentrations in terms of P.P.L.E. ranged from 0·012 to 0·025 mU per ml. In the remaining cases the figures shown in table I represent the lowest concentrations detectable. In case 9 a portion of the blood obtained at operation was centrifuged and, within 10 minutes of collection, 1 ml. of plasma was tested for antidiuretic activity, but none was detected in a rat responding to 0·1 mU of P.P.L.E.

In case 3, in which both activities were detected, the ratio of oxytocic to antidiuretic activity was about 100 : 1.

### *Recovery of P.P.L.E. added to Blood*

In four of the cases included in table I the blood was divided into several portions. One portion was used for the assay of endogenous activity. P.P.L.E. was added in different concentrations to the remaining portions, and the recovery was estimated by deducting the endogenous

TABLE II—RECOVERY OF P.P.L.E. ADDED TO BLOOD OBTAINED FROM PATIENTS LISTED IN TABLE I

| Case no. | Volume of blood (ml.) | P.P.L.E. added | | Percentage recovery of activity | |
|---|---|---|---|---|---|
| | | Amount (mU) | Concentration (mU per ml.) | Oxytocic | Antidiuretic |
| 7 | 12·5 | 0·5 | 0·04 | N.E. | 35 |
| 9 | 5·0 | 0·5 | 0·10 | N.E. | 20 |
| | 5·0 | 1·0 | 0·20 | N.E. | 35 |
| | 5·0 | 20·0 | 4·00 | 33 | 35 |
| | 5·0 | 40·0 | 8·00 | 21 | 45 |
| 10 | 5·0 | 0·5 | 0·10 | N.E. | 35 |
| | 5·0 | 20·0 | 4·00 | N.E. | 30 |
| | 5·0 | 40·0 | 8·00 | 50 | 30 |
| | 5·0 | 80·0 | 16·00 | 35 | 32 |
| 11 | 5·0 | 10·0 | 2·00 | N.E. | Dialysed 16 (undialysed 16) |
| | 5·0 | 20·0 | 4·00 | N.E. | Dialysed 23 (undialysed 20) |
| Mean percentage recovery .. .. | | | | 35 | 31 |

N.E., not estimated.

TABLE I—ENDOGENOUS OXYTOCIC AND ANTIDIURETIC ACTIVITY IN BLOOD FROM THE INTERNAL JUGULAR VEIN IN PATIENTS AT OPERATION

| Case no. | Sex | Age (yr.) | Condition | Drugs used for induction (g.) | Blood | | Activity in terms of P.P.L.E. (mU per ml.) | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Taken after induction (min.) | Volume (ml.) | Oxytocic | Antidiuretic |
| 1 | F | 58 | Duodenal ulcer | T 0·50, C 0·05 | 10 | 9·5 | 1·8 | < 0·03 |
| 2 | M | 47 | Cholelithiasis | T 0·50, G 0·08 | 5 | 15·0 | 1·2 | < 0·01 |
| 3 | F | 64 | Hiatus hernia | T 0·50, S 0·05 | 15 | 24·0 | 1·6 | 0·012 |
| 4 | M | 59 | Carcinoma of rectum | T 0·25, C 0·05, Pr 0·05, Pe 0·05 | 20 | 11·0 | 2·3 | < 0·02 |
| 5 | F | 27 | Cystic mastitis | T 0·65, G 0·08 | 10 | 6·5 | N.D.* | < 0·03 |
| 6 | F | 20 | Fibro-adenoma of breast | T 0·65, G 0·08 | 15 | 15·0 | 1·1 | < 0·02 |
| 7 | M | 59 | † Carcinoma of prostate | T 0·50, S 0·05 | 15 | 25·5 | Not estimated | 0·020 |
| 8 | M | 18 | Inguinal hernia | T 0·50 | 10 | 40·0 | 1·7 | < 0·01 |
| 9 | F | 43 | Biopsy of cervical lymph-node | T 0·50, S 0·05 | 20 | 51·0 | 1·2 | < 0·02 |
| 10 | F | 63 | Carcinoma of breast | T 0·50, G 0·08, Pe 0·05 | 5 | 33·0 | N.D.* | 0·025 |
| 11 | M | 71 | † Carcinoma of prostate | T 0·25, S 0·075 | 5 | 20·0 | Not estimated | 0·012 |

* N.D., not detected; for explanation see text.

C, chlorpromazine. G, gallamine triethiodide. Pe, pethidine. Pr, promethazine hydrochloride. S, suxamethonium chloride. T, thiopentone sodium.

from the total activity. The results are shown in table II. The recovery of oxytocic activity varied from 21 to 50% (mean 35%) and of antidiuretic activity from 16 to 45% (mean 31%). In case 7 a sample of blood was divided into two portions, each of 12·5 ml. To one portion 0·5 mU of P.P.L.E. was added to give a concentration of 0·04 mU per ml. The assay of antidiuretic activity in the extracts is illustrated in fig. 2. A difference was detectable between the endogenous activity in E1 and endogenous plus exogenous activity in E2. 35% of the added P.P.L.E. was recovered from E2, whose activity was abolished by thioglycollate.

Further experiments were made to determine at what stage activity of the extracts was lost.

For this purpose blood was obtained from the carotid artery of rats anæsthetised with either ether or ethyl alcohol and, in one case, from the median cubital vein of a human subject. P.P.L.E. was added in relatively large amounts so that endogenous activity could be neglected. In each extraction a portion of the supernatant fluid at the end of stage 1 (see above) was conserved, and the remainder was allowed to evaporate to dryness overnight (stage 2). The two fractions were then assayed for antidiuretic activity.

The results are shown in table III. The mean recoveries at the end of stages 1 and 2 were 58% and 37% respectively. In experiment 6, in which there was no loss of activity in stage 2, the residue was not allowed to remain

TABLE III—RECOVERY OF ANTIDIURETIC ACTIVITY AT TWO STAGES IN EXTRACTION PROCESS

| Source of blood | % recovery | |
|---|---|---|
| | Stage 1 | Stage 2 |
| Rat (carotid artery) | | |
| Experiment 1 | 55 | 44 |
| ,, 2 | 58 | N.E. |
| ,, 3 | 87 | 17 |
| ,, 4 | 50 | 27 |
| ,, 6 | 52 | 52 |
| ,, 7 | 48 | N.E. |
| ,, 8 | 46 | N.E. |
| Human (median cubital vein) | 66 | 45 |
| Mean | 58 | 37 |

N.E., not estimated.

dry but taken up in water as soon as evaporation was complete. However, in experiment 3, in which a dry residue was heated for 3 hours at 45°C, only 20%—i.e., 17% of 87%—of the activity present at the end of stage 1 was recovered in the final extract.

Similar loss of activity was observed also in aqueous solutions of P.P.L.E. acidified with normal sulphuric acid or with 0·25% acetic acid and allowed to evaporate to dryness. In other experiments, in which unacidified ethyl alcohol was used or the supernatant fluid was neutralised before evaporation to dryness, the recovery was not more than 11%. We conclude that activity is unstable in dried extracts. In certain experiments portions of the extracts were tested after dialysis, but no loss of activity was detected compared with undialysed controls.

## Discussion

As highly concentrated extracts were required for detecting endogenous activity, the supernatant fluid was in most cases evaporated to dryness at 40°C. Care was taken to use the same procedure in the control experiments, in which the recovery of added P.P.L.E. was about a third. It was subsequently shown that P.P.L.E. is unstable in dried extracts exposed to heat; this may explain in part the low level of recovery. Improved methods of concentration are being investigated.

We suggest that the active principles in the extracts are the hormones of the neurohypophysis. Non-specific factors are eliminated in the methods of extraction and assay. Substances having oxytocic activity, such as potassium, 5-hydroxytryptamine, and pain-producing substance (Armstrong et al. 1955), are excluded either by the use of siliconed syringes to collect blood or by dialysis of the extracts. In the assay of antidiuretic activity injections are given intravenously. Stable antidiuretic substances not of pituitary origin are relatively inactive by this route (Dicker and Ginsburg 1950, Heller 1951, Ames and Van Dyke 1952, Dicker 1953, Ginsburg and Heller 1953, Erspamer and Sala 1954). The fact that activity is abolished by sodium thioglycollate is presumptive evidence that it is due to the oxytocic and antidiuretic hormones of the neurohypophysis (Van Dyke et al. 1942, Heller 1955). Final proof would require the demonstration that extracts from the blood of patients with diabetes insipidus are inactive. Such evidence has not yet been obtained.

Antidiuretic activity was detected in only four of the eleven cases investigated. The highest concentration, in terms of P.P.L.E., was 0·025 mU per ml.

An antidiuretic substance has been reported in human serum equivalent to concentrations of A.D.H. as high as 0·25–5·0 mU per ml. (Lloyd and Lobotsky 1950, Slessor 1951, Hawker 1952), but Lewis (1952) has argued against the identity of this substance with A.D.H. A serious criticism is that the serum was injected into rats intraperitoneally, a method which, owing to the presence of interfering substances, must be considered invalid for the assay of A.D.H. Using an intravenous technique Heller and Schnieden (1955) tested blood obtained from the internal jugular veins of three normal subjects under local anæsthesia and found no antidiuretic activity (<0·020, 0·020, and 0·011 mU per ml.). These results substantiate ours.

Oxytocic activity was detected in seven of the nine cases in which it was investigated. The mean concentration in terms of P.P.L.E. for the whole series was 1·2 mU per ml. Considered in relation to antidiuretic activity such a concentration may appear unphysiological. However, in most experiments in which the release of both oxytocin and A.D.H. has been investigated indirectly in different species by the effects of stimulation of the neurohypophysis on peripheral organs, a high ratio of oxytocic to antidiuretic activity has been found (Harris 1948, Cross 1951, Abrahams and Pickford 1954). For example, Cross (1951) found that, in the hydrated rabbit, the antidiuretic effect of suckling could be reproduced by the injection of 0·4–1·0 mU of P.P.L.E., whereas the amount of P.P.L.E. required to cause let-down of milk was 50–200 mU. Moreover our results do not represent basal conditions. Blood was collected under anæsthesia with barbiturates, which are known not only to stimulate the neurohypophysis (De Bodo and Prescott 1945) but also to modify its response to other stimulants—e.g., nicotine (Supek and Eisen 1953). Possibly the ratio of oxytocic to antidiuretic activity may have been enhanced by the preferential release of oxytocin.

The presence, in the blood of both males and females, of a substance believed to be oxytocin raises speculations about the function of this hormone in the male. A possible function is to influence the renal excretion of electrolytes. Brooks and Pickford (1956) have shown that oxytocin, given in sufficiently large doses, has a natriuretic action in the dog, which is enhanced if vasopressin (A.D.H.) is given simultaneously. The relative doses of oxytocin and A.D.H. were determined by the ratio in which these hormones were released in the dog during stimulation of the neurohypophysis (Abrahams and Pickford 1954). The fact that the functions of oxytocin and A.D.H. may be interrelated and may depend on the ratio in which they are released has been neglected in most previous investigations. The present work is the first attempt to establish directly, by assay of both oxytocic and antidiuretic activity in single specimens of blood, the ratio in which oxytocin and A.D.H. are released under certain

conditions in man. If the activity detected in blood extracts is due to the hormones of the neurohypophysis, we must suppose either that the ratio of oxytocin to A.D.H. in man may be very high or that oxytocin may be released independently of A.D.H.


### Summary

Extracts of blood from the internal jugular veins of eleven patients at operation were assayed for oxytocic and antidiuretic activity.

Oxytocic activity was assayed in nine of the cases; the mean concentration in terms of P.P.L.E. was 1·2 mU per ml. (S.E. ± 0·26). In two cases activity was not detected.

Antidiuretic activity was detected in only four of the eleven cases; the highest concentration in terms of P.P.L.E. was 0·025 mU per ml.

In experiments in which P.P.L.E. was added to blood and extracted, the recovery was about a third. The figures given for endogenous activity have not been corrected for loss on extraction.

Reasons are given for supposing that the activity detected in the extracts was due to the oxytocic and antidiuretic hormones of the neurohypophysis.


We are grateful to Mr. W. P. Greening and the anæsthetists of Charing Cross Hospital for their willing coöperation, and to the patients who kindly consented to have blood withdrawn. We should like to thank Miss Jean Phillips and Mr. K. Sparke for their technical assistance.

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". . . There has never been pure chance in any discovery in the medical world, for all such events have always been tied in some way or other to the cultural atmosphere of each period, which fosters the development of certain types of discovery in preference to others. . . . The yearning to find *motion* in all forms of existence that pervaded Harvey's era . . . provided the philosophic inspiration for Harvey's discovery that the blood *moves* and that it does so *in a circle*. In our time, the increasing concentration of the scientific minds on the study of antibiotics may be considered by future historians as the philosophic expression of an age in which every effort—art, physics, science in general—was focused on disintegration, on the reduction of man and his universe to atoms. . . . Before the present century comes to an end, civilisation—and, of course, in its train medicine, which is but one of its many facets—will reach back to the wider conceptions of philosophy and monumental synthesis. . . ."—Dr. F. MARTI-IBANEZ, at the fourth Annual Symposium on Antibiotics, Washington, D.C., Oct. 17–19, 1956.

# IDENTIFICATION OF BACTERIAL RESIDUES IN SARCOID LESIONS


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"FAILURE" to demonstrate tubercle bacilli in sarcoid lesions is the major objection to regarding sarcoidosis as a manifestation of tuberculosis" (*Lancet* 1956).

We have looked for bacterial residues of previous tuberculous infection in lesions showing typical sarcoid change histologically. We found α-ε-diaminopimelic acid (D.A.P.) and mycolic acid; these residues are not normally present in mammalian tissue but occur in certain species and genera of bacteria, including *Mycobacterium tuberculosis*.

### Case-reports

**Case 1.**—A bus conductor, aged 35, had three years' history of attacks of redness and pain, with blurring of vision, in the left eye. The attacks lasted one or two days at intervals of one or two weeks. In the three years he was admitted to hospital six times with this condition. Iritis with secondary glaucoma was diagnosed. In January, 1953, he was given subconjunctival cortisone and remained fairly well until June 1954, when the symptoms recurred. They responded to subconjunctival cortisone and pilocarpine. In November, 1954, he was readmitted to hospital, where several staphylomata were noted at the corneoscleral junction. These were aspirated and injected into a guineapig because it was thought possible that there was a tuberculous infection of the eye. The guineapig test was negative.

In February, 1955, the patient had a recurrence of his eye symptoms, with enlarged cervical lymph-nodes on the left side. Biopsy of the lymph-nodes showed signs of sarcoid. X-ray examination of his chest at this time showed a soft-tissue shadow just above the aortic knuckle. The erythrocyte-sedimentation rate was 5 mm. in the first hour (Wintrobe). The Wassermann reaction and gonococcal complement-fixation tests were negative.

**Case 2.**—A man, aged 44, was admitted to hospital with pneumonia. He had persistent shortage of breath, and repeated X-ray examinations showed constant dense shadowing of both lung fields, especially at both hila. No tubercle bacilli were found in his sputum on repeated examination. Thoracotomy was done, and histological examination showed sarcoid lesions of the lung.

**Case 3.**—A farmer, aged 46, had skin lesions which had been diagnosed as sarcoid in 1952 after biopsy material had been examined histologically. He was treated with calciferol and isoniazid without much benefit. He developed increasing dyspnœa, and radiography of the chest showed pulmonary fibrosis, especially in the mid-zones. In December, 1955, he was admitted to hospital and was given cortisone 100 mg. daily, the dosage being reduced to 25 mg. daily after a month. Treatment has now been discontinued. The skin lesions responded to treatment at first but thereafter became active again.

**Case 4.**—A man, aged 51, was first seen as a very dubious contact of a case of tuberculosis. He was symptom-free. He underwent exploratory thoracotomy because radiography of his chest showed enlarged hilar lymph-nodes. At operation a palpable mass was thought to be an intrabronchial neoplasm. Pneumonectomy was done, and the mass was found to be an enlarged parabronchial lymph-node, which showed histologically typical sarcoid lesions.

### Method

A portion of tissue containing sarcoid lesions was obtained from each of these patients: 10 g. of cervical lymph-node from case 1; 8 g. of lung from case 2; 3 g. of skin and subcutaneous tissue from case 3; and 10 g. of hilar lymph-node from case 4.

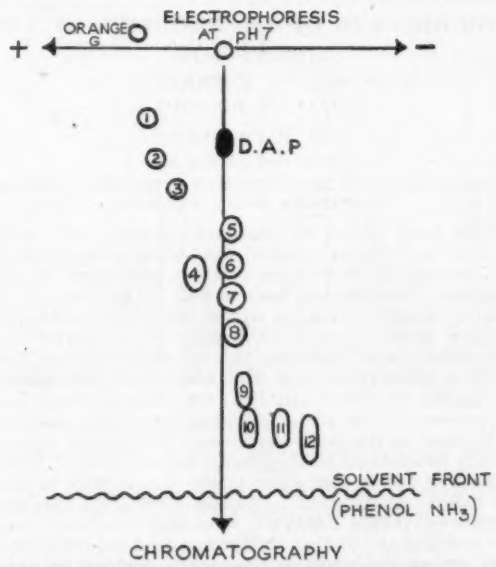


**Fig. 1—Chromatophoretogram of protein hydrolysate of lymph-node: D.A.P., diaminopimelic acid; 1, cysteic acid; 2, aspartic acid; 3, glutamic acid; 4, dibromotyrosine; 5, serine; 6, glycine; 7, threonine; 8, alanine; 9, valine; 10, leucine; 11, arginine; 12, lysine.**

This tissue was washed in physiological saline solution and autoclaved for six hours with twice its volume of distilled water. This removed the collagen but left most of the amino-acids intact in the tissue. The residues were then hydrolised with 10 ml. of 6 *N* hydrochloric acid for twenty-four hours at 110°C. The hydrolysates were separated from the humin by filtration and placed in a vacuum desiccator containing caustic soda to remove excess fluid. They were treated for five minutes with bromine water, again dried in the vacuum desiccator, and then diluted to 0·5 ml. with distilled water.

0·05 ml. of each of these was placed at the origins of chromatograms, half-way across sheets of Whatman no. 1 filter-paper 40 cm. wide, and then run for forty-eight hours in water-saturated phenol in an ammoniacal atmosphere (Consden and Glynn 1955). During this time the solvent fronts moved 50 cm., giving longitudinal separation of the amino-acids.

The papers were thoroughly dried; they were sprayed lightly with *M*/20 phosphate buffer pH 7 on both sides of the papers, first on either side of the chromatograms and then over the chromatograms. A spot of orange G was placed as a marker above the origin of each chromatogram.

The papers were placed horizontally in electrophoresis tanks, with their sides dipping into *M*/20 phosphate buffer pH 7 contained in the inner compartments of the tanks. A current of 10 mA was passed across each paper for six hours. The basic amino-acids migrated towards the cathode and the acidic to the anode.

The orange G moved at the same rate as the aspartic-acid spot and showed the degree of migration sideways. Each paper was removed, dried thoroughly, sprayed with 0·2% ninhydrin in acetone, and heated for five minutes at 100°C, when each amino-acid spot developed its particular colour.

Fig. 1 shows that D.A.P. moves very slowly towards the cathode and has a low $R_f$ value, whereas cysteic acid, aspartic acid, and glutamic acid, whose $R_f$ values are near those of D.A.P., migrate towards the anode. Thus, after two-way separation, D.A.P. is, on each chromatogram, in a position occupied by no naturally occurring mammalian amino-acid (Consden and Glynn 1955).

To confirm that D.A.P. was present in each lesion further chromatograms were prepared by placing 0·05 ml. of each residue solution on a Whatman no. 1 filter-paper 50 cm. long and 8 cm. wide. These were run in pyridine/hydrochloric-acid/methanol solvent for twelve hours (Rhuland et al. 1955). The chromatograms were dried and developed with ninhydrin in the usual way, when yellow-green spots were obtained which gave a pink colour under ultraviolet light. These were in between aspartic and glutamic acids and, both in position and in colour reactions, were similar to those obtained with pure D.A.P.

The humins separated from the hydrolysate in the processing for D.A.P. were extracted with 5 ml. of chloroform. The extract was evaporated. The resultant crude waxes obtained were each redissolved in ether. On the addition of methanol a white precipitate formed in each case. This was separated and dried. A portion of each specimen was melted on filter-paper and stained with hot strong carbol fuchsin. Each specimen was found to be both acid-fast and alcohol-fast and therefore contained mycolic acid (Philpot and Wells 1952).

Samples of the materials precipitated were next examined with an infra-red spectrophotometer. As a control, wax C obtained from a steam-killed human strain of *M. tuberculosis* was examined at the same time (fig. 2).

## Discussion

Work (1949) discovered D.A.P. in *Corynebacterium diphtheriæ* and Asselineau and Lederer (1950) in *M.*

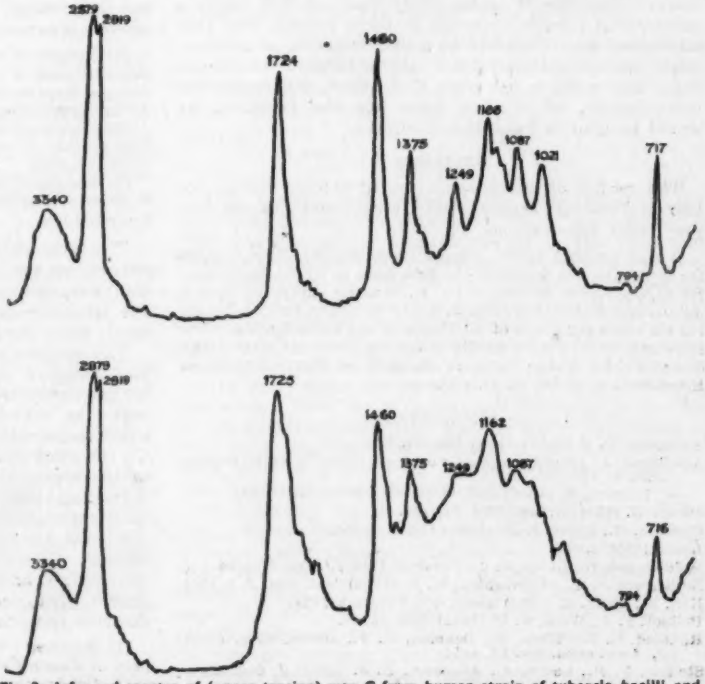


**Fig. 2—Infra-red spectra of (upper tracing) wax C from human strain of tubercle bacilli and (lower tracing) mycolic acid from sarcoid lesions of case 1. Wave nos. in cm.$^{-1}$.**

*tuberculosis*. It has never been found in mammalian tissues. We have found it in lesions of massive pneumoconiosis (Nethercott and Strawbridge 1956) and in Caplan's nodules in coalminers with rheumatoid arthritis (unpublished).

Mycolic acid was discovered by Stodola et al. (1938). Middlebrook et al. (1947) found that cultures of virulent human tubercle bacilli, grown on albumin liquid medium containing 'Tween-80,' showed serpentine cords consisting of bacilli oriented in parallel along the long axis of the cord. Bloch (1950) worked on the hypothesis that this was due to a substance on the surface of the bacterial cell because hydrocarbon solvents disrupted the cords. This substance, cord factor, was isolated with various lipid solvents and was acid-fast.

Anderson (1941), using several solvents, fractionated the various lipids of the tubercle bacillus and obtained a purified wax which had the toxic properties of cord factor. Noll and Bloch (1953) showed that a constituent of the purified wax was wax C, which was mainly an ester of mycolic acid and trehalose. Fig. 2 shows that there is considerable similarity between the infra-red spectrum of mycolic acid obtained from a sarcoid lesion and that of wax C obtained from tubercle bacilli.

Fig. 1 shows a typical example of the electrophoretochromatogram obtained from the sarcoid lesions. Each one revealed D.A.P. together with large amounts of aspartic and glutamic acids. All three of these substances are known to be present in various species of bacteria, including the mycobacteria. It is thought that amino-acids are only found in the human strains of tubercle bacilli (Asselineau et al. 1950).

We have demonstrated both mycolic acid and D.A.P. in lesions which showed sarcoidosis on histological examination. Mycolic acid cannot be a degradation product of human tissue, because the molecule is much larger than that of any fatty acid normally found in the body. Similarly D.A.P. is not a normal constituent of the body. Therefore it seems likely that, at one stage, a tuberculous process occurred in these lesions, and that sarcoidosis may therefore be a manifestation of tuberculosis. Sarcoid material is not easy to obtain; we publish these four cases in the hope that others will repeat the investigation, or, if they have not the facilities, we would be glad to have the specimens.

**Summary**

The results of an investigation of sarcoid lesions for bacterial residues suggest strongly that these lesions were previously tuberculous.

We are grateful to Mr. Rupert Parry and Mr. R. E. Packer for supplying the details of the first case, to Dr. D. McKinnon for supplying the nodule, to Dr. R. Salm for supplying clinical details and material of cases 2, 3, and 4, and to Prof. J. Gough for his encouragement at all stages of the investigation. The intra-red spectra were kindly made by members of the staff of the British Nylon Spinners' Factory, at Pontypool, under the direction of Dr. C. G. Cannon.

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# THE RESULTS OF ARTHRODESIS OF THE GREAT TOE

## WITH SPECIAL REFERENCE TO HALLUX RIGIDUS

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FOR many years the standard operation for hallux rigidus and hallux valgus has been some form of arthroplasty or, to be more accurate, some form of joint excision. The aim has been to relieve pain and, in the case of hallux rigidus, to restore movement at the site of the metatarso-phalangeal joint of the great toe. In recent years, however, the opinion seems to have become widespread that the results of arthroplasty, especially in hallux rigidus, are disappointing, and arthrodesis of the metatarso-phalangeal joint has been introduced as the method of choice. Bonney and Macnab (1952) recommend this operation for all cases of hallux rigidus and state that arthroplasty has no place in cases of hallux rigidus with a primus metatarsus elevatus. McKeever (1952) described successful results in fifty-six toes and stated that the technique of the arthrodesis was not as important as the correct position in which to make the fusion.

With a view to testing the proposition that arthrodesis of the metatarso-phalangeal joint of the great toe is superior to arthroplasty, thirty-eight toes operated on by either method in the last five years were studied. It is freely admitted that, when broken down into categories, the number of cases is too small to provide a final answer, but at the same time it is felt that, if one operation is significantly better than another, a trend should show itself even in a relatively small series. In addition to the quality of the final result, three other points in this follow-up have been investigated which are important in considering the surgical treatment of such a common condition:

(1) Length of stay in hospital: hospital beds are much in demand, and a quick turnover in the treatment of minor complaints is desirable, so long as this can be achieved without adversely influencing the end-result.

(2) Length of time before the patient could walk reasonably comfortably in outdoor shoes and so get back to relatively normal duties.

(3) Length of time before the patient was completely and fully recovered from the effects of the operation and leading a normal life.

The estimation of the quality of the final result rested entirely on the patient's own assessment. This information was obtained by postal questionnaire to minimise the tendency for the loyal patient to overestimate his result when personally interviewed by the surgeon.

The surgeon's own assessment of the quality of the postoperative result in this particular condition can be extremely misleading: it is difficult to feel satisfied with the sometimes loose and flaccid, and at other times rather stiff, great toe that results from arthroplasty. On the other hand, it is impossible not to feel some pride in the straight firm toe that results from arthrodesis, indicating that a reasonably intricate operation has been successfully performed.

It was therefore felt that the patient must decide himself, since the operation was performed purely for his comfort, and each was given a choice of five possible grades when answering the question "How would you describe the final result of your operation?":

(1) *Excellent*: like a normal foot; can do anything without pain or discomfort.

(2) *Good*: very satisfied with result and greatly improved, but still occasional discomfort.

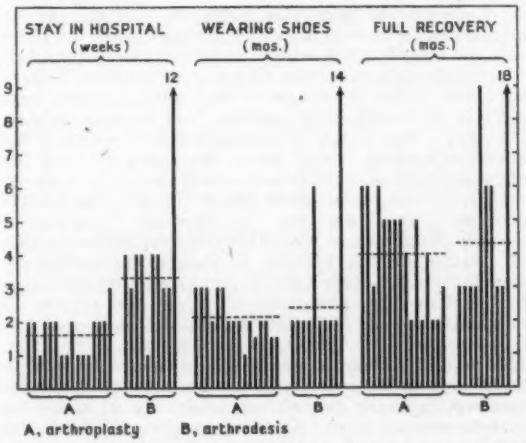


**Fig. 1—Comparison of results obtained in arthroplasty and in arthrodesis.**

Each vertical line represents an individual case. Each horizontal line represents the average for the group.

(3) *Fair:* better than before operation but still a fair amount of trouble with the toe.
(4) *Poor*: no better than before the operation.
(5) *Bad:* worse than before the operation.

## Material

*Arthrodesis.*—There were 8 patients, 2 with bilateral lesions, making ten toes operated on. Seven of the operations were for hallux rigidus, and three for hallux valgus. In 9 patients some form of compression arthrodesis was done; in 1 an oblique screw was used. Except in 1 case the follow-up was more than a year, and in 5 cases it was three years.

*Arthroplasty for Hallux Rigidus.*—There were 13 patients, 3 having bilateral lesions, making sixteen toes operated on. In fifteen of these the operation was a Keller's arthroplasty, and on one a Mayo's operation was done. The shortest follow-up was fifteen months, the majority being operated on in 1953 or early 1954.

*Arthroplasty for Hallux Valgus.*—There were 7 patients, 5 having bilateral lesions, making twelve toes operated on. Nine of these operations were Keller's, three were Mayo's. The follow-up period was exactly the same as in the previous group.

## Results

The main comparison was between arthrodesis and arthroplasty of the metatarso-phalangeal joint of the great toe in hallux rigidus. A subsidiary study was the comparison of the results of arthroplasty in hallux rigidus and hallux valgus.

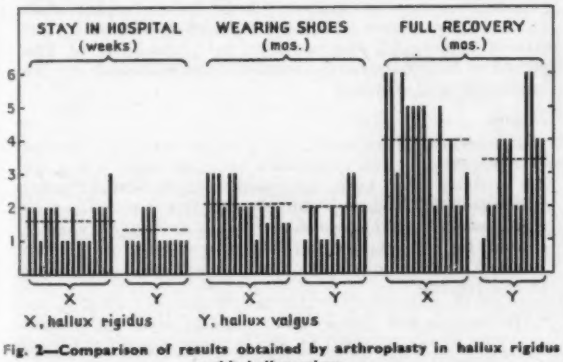


**Fig. 2—Comparison of results obtained by arthroplasty in hallux rigidus and in hallux valgus.**

Fig. 1 shows the length of stay in hospital for the two groups. Note that, with 1 exception, there is considerable uniformity in the cases comprising each group; there is therefore little reason to suspect that a larger series would give a very different picture. It can be seen that arthroplasty occupies a bed for just less than half the time required for arthrodesis.

There were no complications in the arthroplasty group, whereas in the arthrodesis group 1 patient became infected and was in hospital for many weeks. This is the 1 exception mentioned above, and this case was not included in estimating the average duration of stay (3·3 weeks). Had this figure been included, the average figure would have been raised to 4·2 weeks. Which of these two averages is the truer this series cannot show, but the higher figure should not be ignored, because there is probably a greater likelihood of such a complication following the more intricate operation. This possibility of septic complications following compression techniques which involve transfixion of the bones with wires, in such a potentially infected region as the foot, cannot be ignored.

The length of time between the operation and the patient's being able to walk comfortably in outdoor shoes shows little difference between the two groups, but arthroplasty has a slight advantage. Here again the infected case was not included in the arthrodesis average. The arthrodesis in which six months elapsed before outdoor shoes could be worn was one in which fibrous union only was obtained.

Arthroplasty has a similar slight advantage in the time taken for complete recovery.

Fig. 2 compares the results obtained by arthroplasty in hallux rigidus and in hallux valgus. It shows that, in every respect, the results for valgus are slightly better than those for rigidus.

The final results, which again show little difference, though arthrodesis now shows a slight superiority over arthroplasty in hallux rigidus, were as follows:

| | *Hallux-rigidus arthrodesis* | *Hallux-rigidus arthroplasty* | *Hallux-valgus arthroplasty* |
|---|---|---|---|
| Excellent .. | 5 | 7 | 6 |
| Good .. | 5 | 8 | 5 |
| Fair .. .. | — | 1 | — |

## Discussion

This inquiry has therefore failed to produce any evidence to support the view that arthrodesis is significantly superior to arthroplasty in the treatment of hallux rigidus. The longer stay in hospital required by arthrodesis did not pay a corresponding dividend in the final functional result; and, even on this score alone, arthrodesis is at a severe disadvantage as a routine treatment in any large hospital service. Furthermore, compared with arthroplasty, arthrodesis undoubtedly leaves more room for complications such as infection, failure to obtain bony fusion, and fusion with the toe at an inconvenient angle. All the fusion operations in this series were done by orthopædic surgeons of senior rank whereas most of the arthroplasties were done by men below the grade of registrar.

This inquiry has also failed to show any grounds for the present apparent dissatisfaction with the time-honoured arthroplasty. The tendency to be dissatisfied with this operation in hallux rigidus, as distinct from hallux valgus, may possibly be due to errors in the pre-operative selection of cases rather than to the quality of the operation itself. Hallux rigidus tends to develop in younger patients than does hallux valgus; and, if operated on early, these young adults will make a far greater demand on their arthroplasty than would the

older patients with hallux valgus. In the Armed Forces, where it seems possible that dissatisfaction with operations for hallux rigidus first originated, it is probable that patients were subjected to operation who, in civil life, would ordinarily have postponed the procedure to a later date. Hallux rigidus is notorious in having periodic painful exacerbations interspersed with long remissions of comfort. The patients in this series were subjected to operation only if an adequate period of delay had shown the necessity for the operation. This period of delay in many cases was mainly that of the ordinary waiting-list. The delaying effect of a waiting-list is perhaps as beneficial in the surgery of hallux rigidus as it is in the surgery of lumbar-disc protrusion.

### Summary

The quality of the end-result after arthrodesis of the metatarso-phalangeal joint of the great toe is not so immeasurably better than that obtained by simple standard procedures as to justify its routine use in hospital practice.

Young patients with painful hallux rigidus, where operation is unavoidable, probably form a special group in which arthrodesis may be advantageous.

This investigation was started at the suggestion and invitation of Mr. John Charnley at Park Hospital, Davyhulme. I am grateful to Mr. D. Lloyd Griffiths for access to clinical records at the Manchester Royal Infirmary.

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## GLYCOCYAMINE AND BETAINE IN MOTOR-NEURONE DISEASE

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THE ætiological problems of motor-neurone disease continue to challenge pathologist and therapeutist alike. The origin of the disorder has been attributed to a curious medley of factors, including chill, anxiety, toxicosis, injury, and inevitably tobacco and alcohol. Excessive use of muscles by athletes has been considered by certain authorities to be at least partly responsible, and it is interesting to learn that some significance has been read into the fact that certain people afflicted with bulbar palsy have been great talkers. The lack of definite evidence about a genuine exogenous cause leads one to the tentative conclusion that there is at work in this condition a primary degenerative process which may prove, in the last analysis, to stem from a metabolic defect genetically conditioned but not necessarily hereditary. The most logical explanation of the disease is to regard it as a selective senescence of the normal reparative processes of the motor cells and a possible manifestation of biochemical ageing.

If this supposition has any foundation, it follows that successful treatment may spring from biochemical modifications of the katabolic-anabolic relationships of the cells concerned. Many generations of neurologists have spoken wistfully of the desirability of discovering the essential pabulum of the nerve-cell. Whatever information emerges from current experiments and theories on the biochemistry of neural function, the true assessment of the efficacy of treatment in motor-neurone disease will come from clinical trials; hence one is justified in carrying on empirical clinical experiments even in the absence of definitive scientific justification. The use of vitamin E (on the basis of its limited value in certain myopathies) and of certain endocrine preparations arose largely as a result of hopeful empiricism combined with a desire to avoid the appearance of therapeutic nihilism in the face of a condition whose course becomes only too clear to those whom it afflicts. Our own experiences with such preparations have not led us to believe that they modify the course of the condition in any way.

From the biochemical point of view the issue is complicated by the confusion between the true source of the muscular wasting, which lies in the nerve-cell, and the physical evidence of the loss of muscle tissue. In common with other diseases in which muscle tissue is lost, motor-neurone disease increases the urinary excretion of creatine (Milhorat and Wolff 1938), but the administration of creatine can do nothing to modify the underlying disorder. On the other hand, it seems clear that adenosine triphosphate and phosphocreatine are the sources of immediate energy in muscle action, and that phosphocreatine plays an important part in neural function. The administration of creatine leads only to a fairly rapid loss of this substance in the urine, but certain amino-acids seem capable of producing retention of phosphocreatine in the body tissues (Tripoli and Beard 1934).

Borsook and Borsook (1951) suggest that the immediate precursor of creatine in animals is glycocyamine, which is methylated to form creatine; the creatine then reacts with adenosine triphosphate in muscle and nerve to form phosphocreatine. Methionine plays a part in this process of methylation, and it has been suggested that betaine may be useful in the reconstitution of methionine from homocysteine in the body. The succession of reactions would be as follows:

(1) Homocysteine + betaine → methionine + dimethyl glycine.
(2) Methionine + glycocyamine → creatine + ? homocysteine.
(3) Creatine + adenosine triphosphate → phosphocreatine + adenosine diphosphate.

It is therefore theoretically possible that the administration of glycocyamine and betaine might either modify the neural metabolism in motor-neurone disease or produce temporary symptomatic benefit by providing a more favourable biochemical background to the muscles in process of denervation. This notion is given some support by the report of the beneficial action of these substances in the recovery stage of poliomyelitis (Borsook et al. 1952). For these reasons the present trial was undertaken.

### Cases and Method

12 cases of motor-neurone disease, 7 in males and 5 in females, are included in this survey. 5 patients belonged to the bulbar-palsy group, 4 showed the picture of progressive muscular atrophy, and the remaining 3 that of amyotrophic lateral sclerosis. The active amino-acids were supplied to 7 of the group, whereas the remainder received a placebo identical in appearance and issued according to a plan prepared by Mr. J. B. Lloyd, chief pharmacist of Manchester Royal Infirmary, so that the patients and the investigator were unaware of the preparation each was receiving until the end of the trial. In the early phases a liquid preparation was used, but later the material was provided in tablet form.* The period of follow-up ranged from 9 to 20 months from the beginning of treatment.

*Dosage*

The optimal dosage of glycocyamine must be a matter of speculation, and quantities ranging from 0·5 g. to 5·0 g. daily have been suggested. An important point which seemed to emerge from the observations of Borsook and Borsook (1951) was that betaine and glycocyamine should be administered in the proportions of 5 : 1 to produce the maximal fixation of glycocyamine as creatine in the tissues.

* The betaine and glycocyamine together with the placebo were kindly provided by the International Minerals and Chemical Corporation, Chicago.

MOTOR-NEURONE DISEASE TREATED WITH GLYCOCYAMINE AND BETAINE

| Case no. | Type of disorder | Sex | Age (yr.) | Duration (mos.) | | | Present state | Treatment |
|---|---|---|---|---|---|---|---|---|
| | | | | Before treatment | After treatment began | Total | | |
| 1 | Bulbar | F | 40 | 36 | 8 | 44 | Dead | Genuine |
| 2 | ,, | M | 58 | 8 | 12 | 20 | Dead | Placebo |
| 3 | ,, | F | 57 | 11 | 14 | 25 | Dead | Genuine |
| 4 | ,, | F | 51 | 13 | 15 | 28 | Alive | Genuine |
| 5 | Amyotrophic lateral sclerosis | M | 52 | 15 | 14 | 29 | Dead | Placebo |
| 6 | ,, ,, ,, | M | 48 | 33 | 19 | 52 | Alive | Placebo |
| 7 | ,, ,, ,, | M | 46 | 36 | 13 | 49 | Dead | Genuine |
| 8 | Progressive muscular atrophy | F | 59 | 27 | 19 | 46 | Alive | Placebo |
| 9 | ,, ,, ,, | M | 54 | 12 | 19 | 31 | Alive | Genuine |
| 10 | ,, ,, ,, | F | 28 | 30 | 19 | 49 | Alive | Genuine |
| 11 | ,, ,, ,, | M | 54 | 27 | 11 | 38 | Dead | Genuine |
| 12 | Bulbar | M | 54 | 20 | Refused further treatment after a month | | Dead | Placebo |

These patients were at first given 1·0 g. of glycocyamine with 5·0 g. of betaine daily in four divided doses. After four weeks the dosage was increased to 1·5 g. (betaine 7·5 g.) and after four more weeks to 2·0 g. (betaine 10 g.). In this period of three months of treatment the patients were seen at fortnightly intervals. Then there followed a period of two or three months in which no treatment was given, and finally a further period of two months on treatment ranging from 2 to 4 g. of glycocyamine daily, except in case 9, who received 6·0 g. daily for a month in this second period. As indicated, betaine was given in the 5 : 1 ratio in all the cases.

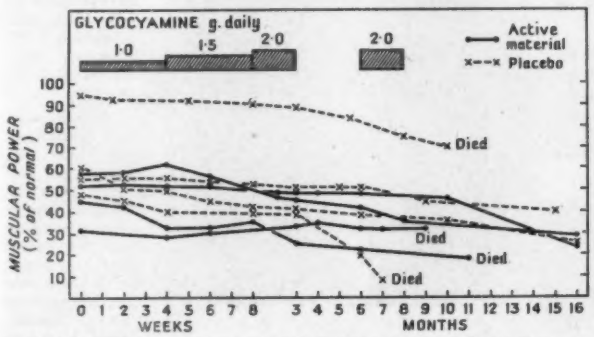
*Assessment of Results*

During the treatment progress was recorded from both subjective and objective points of view, the patients being asked to comment freely on the effects of the preparations. Care was taken to avoid either encouragement or discouragement; the only explanation offered was that this was a form of treatment about which nothing was known. During the period of interruption of treatment the patients' comments were again invited. The objective recordings consisted of measurements of the affected limbs with numerical assessment of power (according to a scale reading from 0 = no power to 6 = full power) of individual muscles. In those patients in whom the disorder was primarily bulbar in distribution, the subjective record was used alone until such time as limb wasting became apparent.

## Results

*Survival Periods and General Picture*

The accompanying table shows the general results. Of the 12 patients treated 7 are dead and 5 survive. It will be noted that 3 of the dead were receiving the placebo and 4 the active principles. Conversely 3 survivors received the genuine mixture and 2 the placebo. The total period of survival from the onset of symptoms, and the period of survival from the beginning of therapy, differ little in the two groups, for the average total duration in the "genuine" group was 39 months and that in the placebo group 37 months. The corresponding averages of survival after treatment were: "genuine" 14 months and "placebo" 16 months. The present state of the survivors does not lead one to conclude that these figures will be materially altered at their deaths.




**Changes in muscle power in 8 patients during treatment with glycocyamine or placebo.**

*Objective Assessment of Progress in Terms of Muscle Power and Bulk*

*Diameter of affected limbs.*—The measurement of limbs as a means of assessing muscular wasting is notoriously difficult. The simple comparison of the diameter of one limb with that of the opposite at levels related to a fixed bony point can be of clinical value, but successive measurements of the same limb over a given period of observation often gives rather confusing results because of variations produced by the state of the overlying tissues and as the result of associated vascular change, with or without overt œdema. In spite of these difficulties seemingly valid measurements were made in 8 cases and gave no indication of any beneficial effect of the administration of betaine and glycocyamine, since the progression in the two groups was virtually identical.

*Assessment of muscle power.*—This technique was used in 8 cases. The method of numerical scoring adopted was as follows:

In the case of the upper limbs a maximum of 6 points was allotted to each of the following functional components: deltoid, biceps, triceps, finger flexors, finger extensors, wrist flexors, wrist extensors, and interossei. This gives a total possible score of 48 points for each upper limb. In the lower limb the muscle groups similarly scored were: psoas, quadriceps, hamstrings, dorsiflexors of the feet, plantar flexors of the feet, dorsiflexors of the toes, and plantar flexors of the toes, giving a possible total of 42 points for each limb.

In the cases examined, either both arms or both legs were used in the scoring, and so the maxima were 96 and 84 respectively. One feels that, with so many muscle groups involved, the observer's error is reduced to a minimum, and that the tabulated results are indeed reasonably reliable.

For the purpose of graphic recording, these results were calculated on a percentage basis, and the collective effect appears in the accompanying figure, which shows that, although there may be a hint that in 3 of the 4 patients who received the betaine and glycocyamine the total power may have increased a little during treatment, the difference between the two groups is insignificant, and the general downward trend is virtually the same in both.

*Subjective Assessment*

In all the cases the patient's own impression of his progress was invited. If any change was noted, he was asked to particularise the nature of this

change and to indicate any specific function which had either improved or deteriorated. The results can be summarised under the two headings of "placebo" and "genuine."

"*Placebo*"—Of the 5 patients in this group 1 (case 6) stated that the medicine made him feel warmer, but he experienced no direct functional benefit. The remainder talked only of their steady deterioration, on which they commented freely and with despair.

"*Genuine.*"—4 of the 7 patients in this group considered themselves improved, explaining that they felt generally stronger and indicating that certain functions, including swallowing, speech, and walking, were better. Case 11, whose neck muscles were early affected, said that he could hold up his head more easily. On the cessation of treatment they felt worse within about seven days, but in retrospect they felt that their general course had not been materially affected by the treatment. The remaining 3 patients were quite certain that the preparation had no effect whatever on their illness. No adverse effects were noted.

### Conclusions

The results obtained from this trial show that glycocyamine and betaine in the dosage used have not fulfilled their possible theoretical expectations in relation to motor-neurone disease. Neither the duration of the disorder nor its short-term course was influenced by these agents, and the behaviour of the control group, assessed by the objective criteria outlined, did not differ significantly from that of the group to which the active principles were given.

It has to be recorded, however, that there was a slight subjective benefit reported by some of the patients receiving the betaine-glycocyamine mixture in contrast to the reports from the control group. It is just possible that this reflects a minor modification of the biochemical background to muscular action. In a condition so uniformly progressive even this minimal subjective gain may justify intermittent use of these preparations, either as agents of psychological value in its otherwise depressing management, or else in the hope of this temporary symtomatic improvement. It is possible that with larger dosage more functional benefit may accrue, but it is improbable that the over-all course of the disorder will be significantly modified.

### Summary

The theoretical biochemical and pathogenic background to motor-neurone disease is discussed briefly, and the possibilities of modifying the progress of the condition are considered.

An account is given of the effects of betaine and glycocyamine on 7 cases compared in a blind trial with 5 cases on a placebo. The dosage of glycocyamine ranged from 1 g. daily to 4 g. daily for five months, and that of betaine from 5 to 20 g. daily.

It is felt that there was no conclusive evidence to indicate any objective beneficial effect of this preparation in this dosage. Some of the patients derived slight subjective benefit from the treatment, which may therefore be useful as an agent of temporary psychological support in the management of a condition for which no adequate remedy is yet available.

I am indebted to Dr. Fergua R. Ferguson and Dr. G. E. Smyth for allowing me to examine the patients under their care.

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# AN UNUSUAL FRACTURE-DISLOCATION OF THE SPINE

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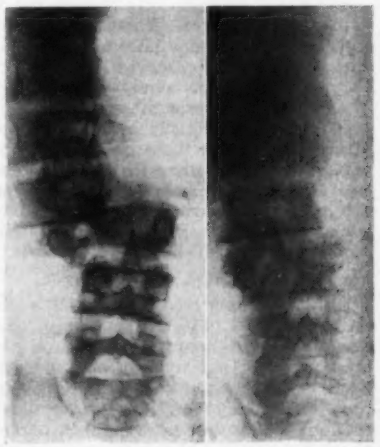
SPINAL injuries can be conveniently classified into stable and unstable, either of which may or may not be associated with major neurological complications. In unstable fracture-dislocations without gross damage to either the spinal cord or the nerve-roots the main aim of treatment is to avoid further displacement, which might lead to serious damage to important nervous structures. Any ill-advised manœuvre, such as hyper-extension where there are interlocked facets, may be disastrous. The following unusual and interesting case is reported because it shows (1) that gross bony displacement may take place without significantly damaging nervous tissue, and (2) a method of approach to a difficult problem in which a wrong decision is likely to be disastrous.

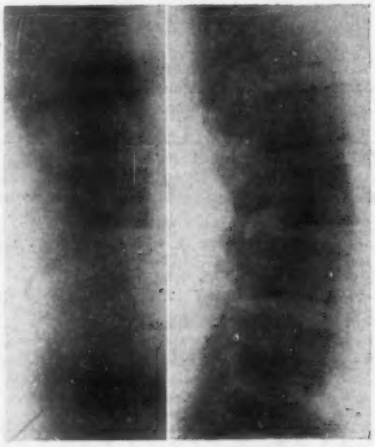


*a* *b*

**Fig. 1—Anteroposterior view of lumbar spine: *a*, before reduction; *b*, after reduction.**

### Case-report

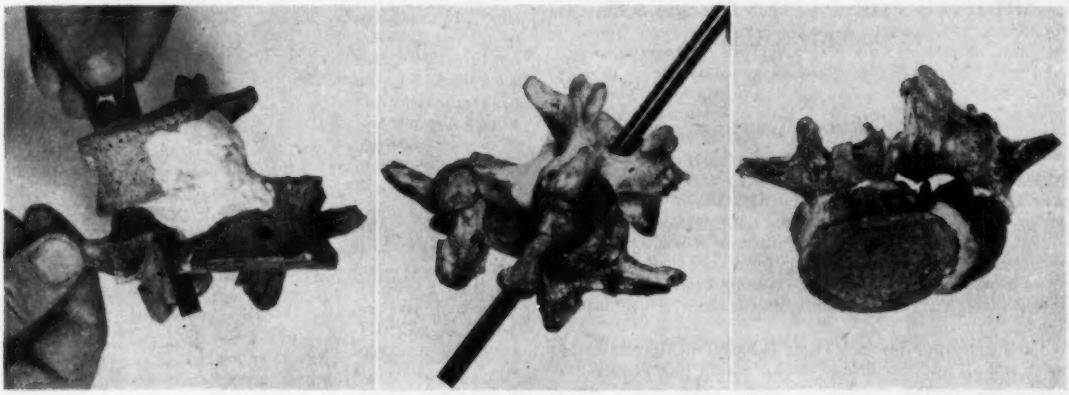
A tractor and swathe-binder ran backwards into a farmer aged 51, striking him in the region of the left kidney and knocking him to the ground. He could not get up and had severe pain in his back and abdomen. He was at once brought to hospital.



*a* *b*

**Fig. 2—Lateral view of lumbar spine: *a*, before reduction; *b*, after reduction.**

*On admission* his general condition was fair; he was pale, drawn, anxious, and in obvious pain but rational and coherent, with pulse-rate 90, respirations 24 a minute, and blood-pressure



*a* *b* *c*

**Fig. 3—Model of lesion : *a*, anterior aspect showing base of fractured pedicle to right of pencil representing dural sac ; *b*, posterior aspect showing fracture of left lamina of third lumbar vertebra ; *c*, vertical aspect showing fracture at base of pedicle.**

170/100 mm. Hg. He had generalised intense abdominal rigidity and tenderness, but bowel sounds were present. He had severe spasm of his lumbar muscles and a large subcutaneous hæmatoma, which prevented accurate palpation of his spinous processes. His whole lumbar spine was very tender, especially the upper portion, and was held rigidly immobile. All his leg muscles were acting, but their strength could not be estimated, owing to pain. His knee-jerks, ankle-jerks, and plantar responses could not be elicited. He had lost cutaneous sensation on the anterolateral aspect of his left thigh ; his vibration sense and joint sense were intact.

*Radiography* showed the appearances illustrated in figs. 1*a* and 2*a*. Firstly, this was clearly an unstable fracture in which there was a risk of serious damage to the cauda equina if a wrong move was made. Indeed, mere relaxation of the spinal muscles, which were in spasm, might lead to further displacement. Secondly, there might be associated visceral damage—in most major spinal injuries at this level there is abdominal rigidity irrespective of visceral damage, and many unnecessary laparotomies have been done in such cases.

*Model.*—To obtain a clear picture of the exact anatomy of the injury a model (fig. 3) was made. To allow room for the dural sac the right pedicle of the third lumbar vertebra must have been fractured at its base, and the neural arch of the same vertebra on the left side must have separated in the interarticular region. In fig. 3 a pencil represents the cauda equina. On radiography the model gave appearances (fig. 4) which corresponded closely to the patient's radiographs (figs. 1*a* and 2*a*). From this it was deduced that the mechanism of injury was probably forced lateral flexion to the right, and that there was no contra-indication to attempting reduction, which, if successful, would improve the stability of the spine.

*Operation.*—One hand was placed behind the patient's back as he still lay supine on the X-ray table with a pillow under his lumbar spine after having been taken out of the ambulance. He was anæsthetised and, with the lumbar region supported, the spine was gently flexed to the left. Radiography showed a satisfactory reduction (figs. 1*b* and 2*b*). An anterior plaster shell was at once made ; when it had set, he was strapped to the shell and carefully turned over, and a plaster bed was made.

*Postoperatively* his recovery has been uneventful : there has been no return of spasm in his abdominal or lumbar muscles ; he has had relatively little pain ; and the only appreciable residual neurological abnormality is impaired cutaneous sensation on the anterolateral aspect of his left thigh.

*Comment.*—In 1945 I saw a similar case under the care of Mr. C. H. Cullen. Open reduction and internal fixation with metal plates was done, but the deformity promptly recurred. Winston (1952) described a different unusual fracture-dislocation of the lumbar spine with gross lateral displacement but relatively little neurological disturbance ; an attempt at reduction by traction was ineffectual.

## Summary

An unusual fracture-dislocation of the lumbar spine with gross lateral displacement but little neurological disturbance is described.

A model of the injury was made, and from it the mechanism of the injury and the best method of reducing it were deduced.

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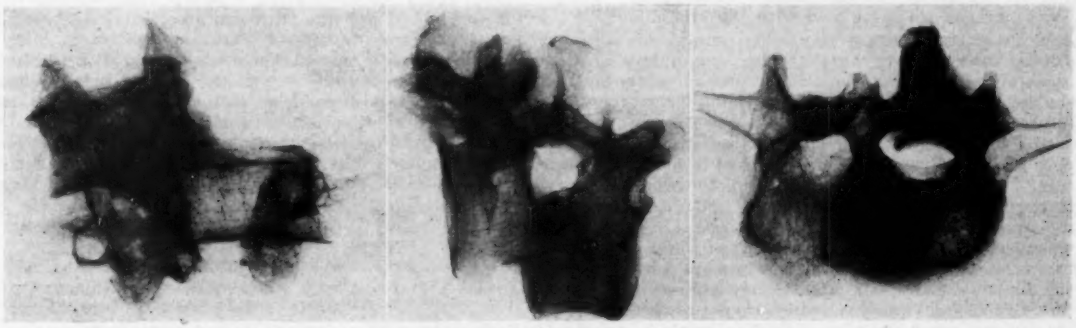
Winston, M. E. (1952) *J. Bone Jt Surg.* **34B**, 88.



*a* *b* *c*

**Fig. 4—Radiographs of model : *a*, anteroposterior view (cf. fig. 1*a*) ; *b*, lateral view (cf. fig. 2*a*) ; *c*, vertical view (cf. fig. 3*c*).**

# HUMIDIFIER FOR PATIENTS BREATHING SPONTANEOUSLY

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THE widespread use of artificial respiration by intermittent positive pressure has shown the importance of preventing inspissation and encrustation of secretions in patients who, owing to paralysis, cannot cough. Similar considerations apply also to patients whose ability to cough is diminished either by pulmonary disease (e.g., bronchitis, emphysema, and tracheobronchitis) or by operation (e.g., tracheotomy, thoracotomy, and laparotomy).

The humidifier described here is based on that described by Marshall and Spalding (1953), which has been extensively used with positive-pressure respiration pumps (Russell et al. 1956) and has proved effective in keeping bronchial secretions moist.

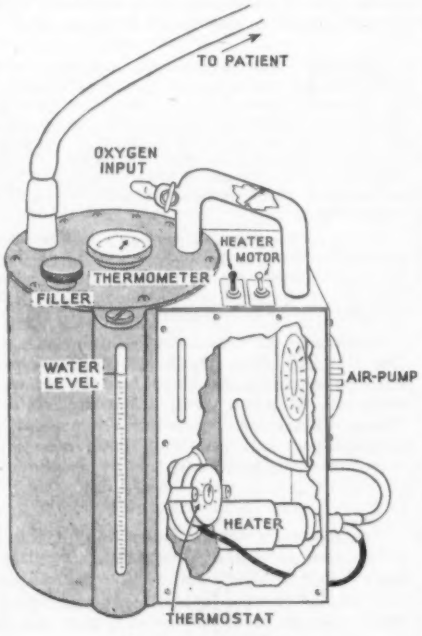

Fig. 1—The humidifier.

The humidifier produces effects very similar to those of a steam kettle, whose benefits are well known. The steam kettle, however, has the disadvantages that the greatest humidity is produced in the roof of the tent instead of near the patient, it exposes a large part of the body instead of only the mouth (or trachea) to damp heat, and it entails a constant danger of scalding. These disadvantages are eliminated with the humidifier.

In its original form a respiration pump blows air or oxygen intermittently through the humidifier. This is unsuitable for patients breathing spontaneously, and in the apparatus here described an air-pump is incorporated to provide a continuous flow.

Gas saturated with moisture at room-temperature is only about 50% saturated when raised to body-temperature. The principle of the new humidifier is that gas is warmed to about body-temperature and saturated with moisture, the water being carried as vapour. An alternative plan, to create a mist of droplets of water suspended in gas at room-temperature, has been rejected because the size of the droplets is extremely difficult to control (and to measure) and yet if they are not of the right size they do not reach the part of the bronchial tree required (Arnold and Tovell 1956).

The humidifier (fig. 1) consists of a closed vessel containing water heated by an electric element under the control of a thermostat; the efficiency of this method in humidifying gas has already been demonstrated (Marshall and Spalding 1953). Attached to this vessel is a centrifugal air-pump of a type that is quiet in operation. It will pass 15 litres a minute through the humidifier and 1 metre of 'Portex' tubing 1 cm. in bore. If, however, it is desired that the patient should breathe oxygen, this can be led into the humidifier by the nipple. A valve ensures that oxygen admitted here cannot escape without passing through the humidifier. The humidified gas is conducted from the humidifier to the patient along a portex tube of 1 cm. bore. The thermostat should be set so as to provide that the gas reaching the patient is at or just below body-temperature. If 1 metre of portex tubing is used, the thermostat should be set at 45–50°C. When the apparatus is started from cold, thirty minutes should be allowed for it to reach equilibrium before the thermostat is adjusted.

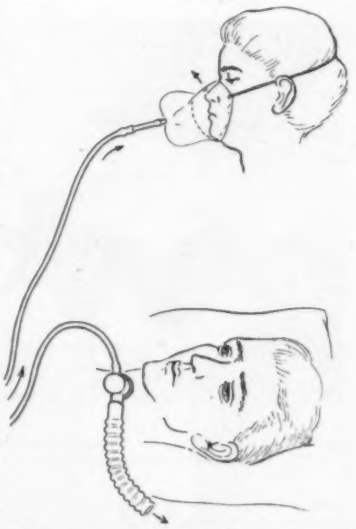
Fig. 2—Connections for patient with and without tracheostome.

When the patient has not undergone tracheotomy, it is convenient to lead the humidified gas to a disposable plastic breathing-bag (fig. 2). This is suitable for patients with bronchitis, asthma, and those who have undergone either thoracotomy or laparotomy.

When patients who have been treated by intermittent positive-pressure respiration are recovering spontaneous respiration, it is often necessary to continue to humidify their inspired air as long as they are breathing through the tracheostome. A simple device enables this to be done. A small box, which is open on the side towards the patient, is placed over the tracheostome. Warm humid air is introduced from the humidifier on one side of this box, and expired air is driven out on the other. The corrugated rubber tube acts as a reservoir ensuring that there is always enough humid air available for each breath. This device resembles in principle that used by Bower (1954) in the United States for humidifying the inspired air of patients with acute poliomyelitis treated in a tank respirator after tracheotomy.

Either of these two methods can be used with children if they coöperate, but very young or very sick children may be incapable of doing so. In these patients no method can be completely satisfactory, but a useful result can be obtained by supporting the tube so that it points at the patient's mouth or at the tracheostome. This supplies the greatest humidity in the air which the child is breathing.

This apparatus is made by Messrs. Owen Mumford, of Abingdon Place, Oxford.

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# Medical Societies

## ROYAL SOCIETY OF MEDICINE

### Epidemiology of Cancer

AT a meeting of the section of epidemiology on Nov. 16 the Jenner Medal for distinguished work in epidemiology was awarded to Dr. PERCY STOCKS. The president of the section, Dr. IAN TAYLOR, was in the chair.

Dr. J. KNOWELDEN described the work and findings, beginning in 1952, of the cancer registry in Kampala, Uganda. A study of the general population was needed to confirm hospital impressions about variations from European figures in cancer-rates for Africans. The centralisation of medical facilities and the channels followed by known cases were such that a registry based on Kampala hospitals (i.e., 3 large African and an Asian and European institutions) covered practically all the recognised cases of cancer in Mengo district, an area 100 miles square. However, there were wide variations in incidence in the 12 sazas comprising the district, with highest rates in Kyadondo, the saza in which Kampala lay, and it was considered that in the remainder there was considerable under-reporting of cases. In future the registry would concentrate on the Kyadondo experience. Additional problems were, on the one hand, those of identifying patients (a patient might use more than one name, often did not know his age, and might give a local not a home address) and, on the other, doubts whether the 1948 census, on which incidence was calculated, reflected the current population. On the whole, comparisons of age-specific cancer-rates in Kyadondo with Denmark showed very similar figures. The calculation of expected rates for Kampala from Danish rates, however, showed a considerable excess over observed rates for carcinoma of the liver and the penis, and a striking deficiency in cancer of the gastro-intestinal tract and uterus (the last possibly due to under-reporting).

Dr. A. G. OETTLÉ said that Johannesburg experience was in close parallel with that in Uganda, both in problems and results. Over all cancer-rates for the Johannesburg Bantu were approximately half those in the American white and Negro races. Rates for cancer of the stomach, large gut, and body of the uterus were low (hopefully indicating the part played by environmental factors in these cancers), but for œsophagus, liver, and Kaposi's hæmangiosarcoma, the figures in males were very high by comparison with those expected from similar populations of Americans. Dr. RICHARD DOLL supported the view that cancer of the stomach was related to environment, and gave figures illustrating the wide variations in international incidence. He drew attention to the important contributions made by Dr. Stocks, especially with regard to the possibility of there being a "soil factor."

Dr. ALICE STEWART explained that she and Dr. Josefine Webb had decided to study the environmental relationships of cancer and leukæmia in young children because their statistical colleague, Mr. David Hewitt, had demonstrated a unique and rising peak of mortality in the 3rd and 4th years of life. Although, by current standards, an antenatal X-ray examination exposed a fœtus to a very small dose of ionising radiations, such a whole-body exposure is likely to be a unique event in any one lifetime. Diagnostic irradiation in utero was therefore sought as a possible explanation of the statistical findings. For each child who had died of leukæmia there was a live control matched for sex and age, but otherwise picked at random from a local list of births. Over half the controls were first picks, but removals, stillbirths, &c., sometimes necessitated taking several names. Refusal-rates for cases and controls were gratifyingly low.

Over 1000 case-control pairs had now been seen and these confirmed an earlier report that irradiation in utero is over one and a half times as common among cases as controls. Barely 8% of the deaths had been caused by these X rays but the ratio of irradiated to non-irradiated cases was the same for all sites of cancer and did not decrease with advancing age (i.e., the effects of irradiation in utero may not be exhausted in ten years). Case and control mothers of equal parity were of comparable age and social class, but there was an unexplained deficiency of first-born children among the controls. An excess of irradiated cases, however, was a feature of all birth ranks and there was also evidence of increased risk with repeated X-ray exposures, so although the control group might be deficient in first-born children this need not, as Dr. Doll said, shake our confidence in the findings. Among 515 cases of leukæmia there were 15 mongolian idiots, but only 1 had been discovered among 557 cases of other malignant disease.

Dr. R. A. M. CASE discussed the Cramer hypothesis. Though it was harmlessly enunciated twenty years ago, today this hypothesis might lead "to an attitude of prophylactic nihilism." Cramer stated that there seemed to be a general law that when, in a given population, cancer in one organ increased in comparison with other populations, there was then a compensating decrease in cancer of other organs. Thus the organ distribution of cancer may be different but the total incidence remains the same. Dr. Case gave examples in which the total amount of cancer had increased when there had been an increase in one site. The hypothesis therefore was not a "general law." Age-specific death-rates for all forms of cancer were not constant for different populations. Nor was there a fixed immune group in the population and a fixed group with inborn susceptibility: susceptibility to bladder cancer, for example, increased with exposure to different substances, reaching 100% in a certain long-abandoned chemical process. Though Dr. Case showed Cramer's hypothesis to be invalid in certain instances, this did not rule out the theoretical possibility of a "site-transfer" system under some circumstances. It would be necessary for anyone wishing to invoke such a system to produce evidence directly related to those circumstances, and not to rely on an appeal to a general law.

# Reviews of Books

### Treatment of Fractures

*Vol. I.* Prof. LORENZ BÖHLER, M.D., director of the Accident Hospital and professor of accident surgery, Vienna. Translated from the 13th German edition. New York and London: Grune & Stratton. 1956. Pp. 1072. £8 12s.

THE reappearance of this classic work in a new English translation is most welcome; it is more than twenty years since Hey Groves translated the 4th edition. The author's experience now covers nearly 700,000 injuries in Vienna—not to mention his wide experience in war-time. Despite his protestations to the contrary, he is highly dogmatic; and bitter experience of maltreatment by others has led him to leave nothing unsaid.

The pages on the open injuries of war are particularly interesting. The fact that penicillin was not in free supply in Austria until some years after the 1939–45 war has led him to give a relatively minor place to antibiotic aid, and the text thus emphasises the ever-present need for sound surgery in gunshot wounds.

In closed fractures Böhler's methods have changed little. While he gives due place to the use of the Küntscher nail in fractures of the middle third of the femur, he still retains his liking for the Braun splint. He still favours circumferential wiring. He declares that for closed reductions and many open operations local anæsthesia remains the method of choice; and an unbiased observer might feel that we should make greater use of this method in this country. He continues to

advocate the unpadded cast; and he emphasises again and again the dangers of over-traction and the desirability of impaction or methods that allow for a little shortening to compensate for the local necrosis of the bone-ends. Some will differ in many instances from his methods in individual fractures, particularly of the spine; but any who follow Böhler closely will treat his patients very well indeed.

The saving of suffering and crippledom that can be ascribed to Böhler's work is incalculable. This is one of the great books in medicine, and we shall look forward to the appearance of the other two volumes.

### Anæsthetic Accidents

*The Complications of General and Regional Anæsthesia.* V. KEATING, M.B., D.A., F.F.A.R.C.S., consultant anæsthetist and lecturer in anæsthetics, University College Hospital of the West Indies. London: Lloyd-Luke. 1956. Pp. 261. 25*s*.

MOST of the complications of anæsthesia are minor—important because they arise at a time when the patient is least able to tolerate them, but rarely so persistent as to incapacitate him. But Dr. Keating is hardly concerned with the minor sequelæ, perhaps because, as his main title suggests, his interest lies more in the prevention of accidents than in the treatment of complications all too commonly accepted as fortuitous. Nevertheless it is a little strange to find no mention of postoperative sickness in a book of this kind.

The main issues are dealt with in some detail, and useful descriptions of normal function draw attention to the superimposed effects of anæsthetic drugs and techniques—effects which, even when therapeutic doses are not exceeded, border on the dangerous. Recent investigations suggest that future progress in anæsthesia may depend partly on eliminating avoidable complications, and this work is a valuable study of the majority of them.

### Dermatology

D. M. PILLSBURY, M.D., D.SC., professor and director of dermatology; W. B. SHELLEY, M.D., PH.D., associate professor of dermatology; A. M. KLIGMAN, associate professor of dermatology, University of Pennsylvania School of Medicine. Philadelphia and London: W. B. Saunders. Pp. 1331. £7.

THE preparation of a large new textbook of dermatology is an act of extreme fortitude; and the authors must have had compelling reasons to undertake this task.

The introductory chapters on anatomy, physiology, and pathology are excellent essays which should be read consecutively. On the clinical side the approach is well balanced, but the authors perhaps err on the side of simplification by omission. The parapsoriasis group, for example, calls for more explanation than as a rag-bag of unclassifiable odds and ends. The style is pleasantly informal; and the 564 black-and-white illustrations are helpful, although facetious diagrams may not be to everyone's taste. The bibliography is limited to a few key references; and this lessens the value of the work for those embarking on a career in dermatology—the group to which it is perhaps mainly addressed.

Despite the care and thought that have gone into its making this vast book is unlikely to be used by undergraduate students except as a work of reference.

### Neurochemistry

*Progress in Neurobiology: I.* Editors, SAUL R. KOREY, M.D., professor of neurology, Albert Einstein College of Medicine of Yeshiva University, New York; JOHN I. NURNBERGER, M.D., assistant clinical professor of medicine and psychiatry, Yale University School of Medicine, Conn. Toronto and London: Cassell. 1956. Pp. 244. 50*s*.

THIS book contains sixteen papers the authorship of which is shared between twenty-four contributors.

The contents have little in common beyond some connection with chemistry or neurology. The papers themselves are for the most part interesting and well presented but are too brief for much depth of discussion. The topics covered include the chemistry of the neural lipids, the metabolism of copper in relation to hepatolenticular degeneration, the chemical embryology of the nervous system, the biochemistry of convulsive states, and some aspects of the general energy-metabolism of the brain.

**The Queen Charlotte's Textbook of Obstetrics** (9th ed. London: J. & A. Churchill. 1956. Pp. 547. 45*s*.).—This popular textbook continues to present in a practical form the current teaching in Britain's oldest maternity hospital. The only new chapter is a short one on postmaturity; but considerable revision has been made, particularly in the chapters on the rhesus factor, psychiatry, and anæsthesia and analgesia. In reviewing the 8th edition we criticised the omission of any reference to "relaxation" (*Lancet*, 1952, i, 800). The authors now state that "relaxation classes" have been given up at Queen Charlotte's because the majority of the staff believe that their chief value lay in reassurance and discussion rather than in the exercises. Educative antenatal care continues in the form of classes conducted by doctors and midwives.

**Gynecologic Cancer** (2nd ed. London: Baillère, Tindall, & Cox. 1956. Pp. 546. 80*s*.).—This work by Prof. James A. Corscaden has gained an established place as a reference book. For the new edition the evaluation of results has been brought up to date and the author has elaborated his views on the value of early diagnosis of accessible cancers. The book is essentially practical, and rare forms of cancer are only briefly mentioned. The bibliography is international and comprehensive. This work will continue to be of value to the gynæcologist and to those concerned more generally with early detection of cancer.

**Textbook of Physiology and Biochemistry** (3rd ed. Edinburgh and London: E. & S. Livingstone. 1956. Pp. 1068. 60*s*.).—The success of this textbook by Prof. G. H. Bell, Prof. J. M. Davidson, and Prof. Harold Scarborough is indicated by its having reached a third edition in six years. A new chapter has been added on fluid and electrolyte balance, and much of the text shows evidence of revision. While the authors show good judgment in the choice of subjects for detailed description, they might reduce even more drastically the space given to outdated topics. We should like to see in the next edition more on such topics as recovery from sympathectomy and modern human pulmonary physiology.

**Refresher Course for General Practitioners** (Third Collection. London: British Medical Association. 1956. Pp. 548. 25*s*.).—The helpful articles in this collection appeared in the *British Medical Journal* in 1952 and 1953, and they have been carefully revised by their authors before publication in this volume. A classified list of contents, covering the three collections so far published, is also included. As Dr. Hugh Clegg says in a preface, this series has been widely welcomed by doctors in both general and special practice; and the latest instalment will clearly enhance its popularity.

**Management in Obstetrics** (2nd ed. London: Oxford University Press. 1956. Pp. 218. 18*s*.).—For the new edition of this compact and practical work, Prof. A. M. Claye has revised the text and included new chapters on postmaturity and retained placenta and also some fresh illustrations. This book was written for general practitioners, and in his preface Professor Claye again expresses the hope that they will play a greater part in the maternity services: "I am quite unable to understand how a man can obtain either enjoyment or intellectual stimulus if he practises so-called midwifery without presiding at the culminating event."

**Progress in Clinical Medicine** (3rd ed. London: J. &. A. Churchill. 1956. Pp. 424. 40*s*.).—The editors, Dr. Raymond Daley and Dr. Henry Miller, have boldly dropped psychiatry from the new edition of their popular book. "Since the appearance of our first edition in 1948," they say, "psychiatry has consolidated its position in the general hospitals of Great Britain and no longer needs the encouraging patronage of general medicine." This omission has made room for two new chapters—on geriatrics and the medical use of radioactive isotopes.

**Biochemical Problems of Lipids** (London: Butterworths Scientific Publications. 1956. Pp. 505. 70*s*.).—The proceedings of the second International Conference on this subject, held at the University of Ghent in 1955, have been published under the editorship of G. Popjak and E. de Breton. The papers are given in English, French, or German, which in our small modern world is probably reasonable, but even the hardiest reader may find it disturbing to change languages several times in the course of a brief discussion.

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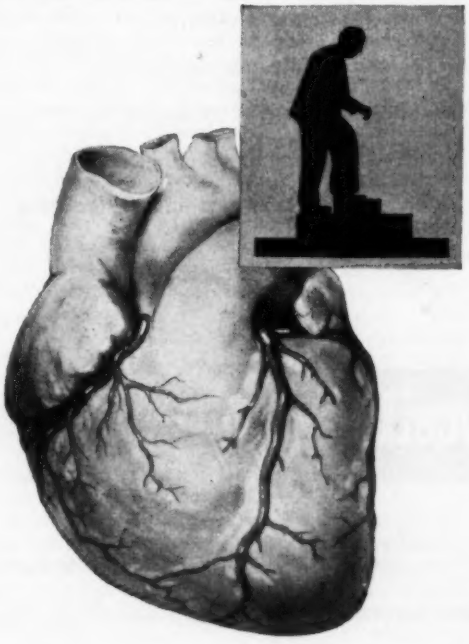

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# THE LANCET

*LONDON: SATURDAY, DEC. 1, 1956*


## Cautionary Cards

A WELL-KNOWN physician used to say that when he was seventy years of age he would hang a card round his neck inscribed "Please do not investigate. Please do not treat." Although he has been ten years a septuagenarian, the card, if it exists, has fortunately not been exposed. This physician's medical philosophy is informed by an outworn therapeutic nihilism, but it carries the useful reminder that intervention may harm those we seek to help. The remedies applied today are powerful, and they have often to be used when, for one reason or another, the patient or his relatives are unable to tell his story or give other relevant facts. Death may then result from the application of treatment which is in general correct but which is fatal for the particular patient. The giving of serum to an allergic patient is a too familiar example of these unspoken dangers. How may the victim of a sudden illness or accident ensure that he, being injured, ill, or unconscious, can yet tell his doctors what they should know?

Some of the organisations formed by sufferers from particular diseases (and their friends) who have joined together to their common advantage have given much attention to this matter. The object of the advice which these associations give their members naturally differs, but in most cases a card is provided by the association which the member is instructed to carry—women in their handbags and men in an inside pocket. The British Diabetic Association issues a card to its members on which should be written the patient's name, address, and telephone number, the name of his doctor, the dose and type of insulin used, and instructions for the treatment of hypoglycæmia. The card of the British Epilepsy Association gives helpful advice about the treatment of the fit, and the disposal of the patient on recovery—namely, not to hospital but to his home. The Haemophilia Society's card gives the patient's blood-group, the name of his hospital physician or pathologist, and a warning that he will need special care if he is injured or bleeding. The British Asthma Association has not yet issued such a card to its members. If it does so, its main object should be to insist on a test dose before the administration of any serum, particularly antitetanic serum. Death from anaphylaxis after the use of antitetanic serum is one of the commonest therapeutic disasters in the casualty department, and asthmatics involved in accidents are in particular danger.

The increasing use of prophylactic tetanus toxoid introduces a further difficulty. The child who arrives at the casualty department without his mother may not know whether or not he has had asthma; even if his mother is with him she may not remember whether he has had tetanus toxoid. Some local authorities are, therefore, giving cards to the mothers of children who have had tetanus toxoid, and this should prevent uncertainty in the casualty department when the mother accompanies her injured child. The child who has already had toxoid does not require antitetanic serum; all he needs is a boosting dose of toxoid. The head of a casualty department has suggested that each child given tetanus toxoid should at the same time receive a tiny tattoo-mark of a defined colour on a fixed site. A metal disc, worn round the neck or wrist, and giving the minimum of essential information, might be more popular and more easily discovered (but more easily removed). To be useful, warning cards, like tattoo-marks, must be found, and they must be looked for on the unconscious patient. Although a search is regularly made in casualty departments, it is not a practice encouraged by the police: in fact, both police and ambulance men are instructed not to make a routine search of this sort. But it is right that those whose concern is the welfare of the individual should now and again act in defiance of those regulations whose spirit is more honoured in the breach than in the observance.

There are others who may need similar protection: for example, those whose diseases are being continuously controlled by a treatment which may influence the doctor's handling of any intercurrent illness. Such drugs as cortisone, the ganglion-blockers, and antibiotics come to mind. There are those patients who have become sensitive to certain drugs, such as penicillin, those in whom aspirin or phenylbutazone causes gastric hæmorrhage, those who are made manic by the glucocorticoids, and many others who are known to react dangerously to the potent but common remedies of today. A card of warning might also save a child with congenital heart-disease from a dental operation without prophylactic penicillin. A woman who is or has been pregnant usually knows her blood-group, and many women carry cards providing the essential facts. The patient or his parents must be fully informed of these dangers and the reasons why tiresome precautions are necessary to prevent them. We can sympathise with the mother who complains that modern medicine is asking too much of her; but unless parents and doctors will accept these extra responsibilities, preventable tragedies will go on happening.

## The Way We Limp

Give me a staff of honour for mine age.
—*Titus Andronicus*, act I, scene 2.

OUR grandfathers proudly rested their hands on the knobs of their canes as they were driven behind good horses. They stepped out briskly at the end of their journey, adding dignity to their descent with a wave of their stick. And they walked erect, morally and physically supported by this venerable symbol of man's mastery over beast. Today we limp from bus-stop to tube-station; and in our baby cars there is scarcely room to crouch, let alone sit upright with hand on stick. But even if there were room, the offer of a stick would be received by most people with scorn. "The fat lady may waddle like a duck when she laboriously walks a few steps, but she resents the suggestion that she carry a cane. She would look much better with a stick than with a limp; and with support she could walk enough to get some exercise. More walking would help with weight reduction. But no! she is not ready for the cane *yet*." Thus BLOUNT [1] ponders over the sad eclipse of what is not

1. Blount, W. P. *J. Bone Jt Surg.* 1956, 38A, 3.

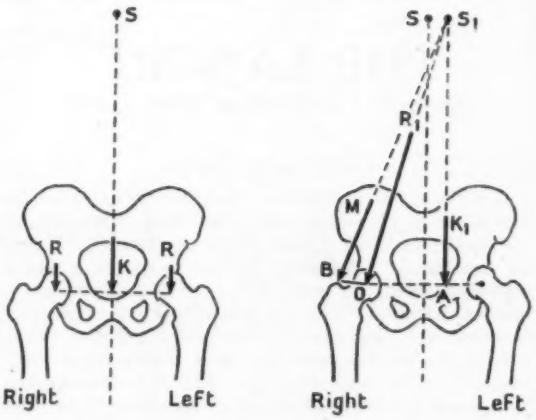
only the oldest, cheapest, and simplest but also the most effective surgical appliance yet designed. Unhappily, the public look upon the walking-stick as a stigma of physical decrepitude and often as a sign of mental and spiritual decline. And so we must limp without it.

As long ago as 1935 PAUWELS [2] demonstrated the mechanical justification for the use of the stick.

Standing normally the weight of the body above the lower limbs (S) rests equally on the two sides, the force on each femoral head (R) being half of the superimposed body-weight (K). If the left leg is raised by bending the hip and knee, but without moving the trunk or pelvis —as in the swing phase of walking—the weight of the left lower limb is added to that of head, trunk, and arms, increasing the weight which has to be transmitted through the right femoral head from K to $K_1$, and shifting the body's centre of gravity from S to $S_1$. In addition the abductors of the right hip must contract and pull the pelvis and trunk down upon the right femoral head in order to prevent the body from falling over to the unsupported side. Because the chief abductors, the glutei medius and minimus, are inserted into the greater trochanter, their balancing pull can be represented by the line M, pointing to B. The centre of the right femoral head thus becomes a fulcrum in a system of forces. The pressure exerted on it ($R_1$) is the sum of $K_1$ and M; and $K_1$ and M depend on the relative length of their levers, BO and OA. If OA is three times the length of BO, then the abductors' downward pull, M, must be three times $K_1$; and the downward thrust on the femoral head at O will be four times the superimposed body-weight.

If the body's centre of gravity is moved further away from the supporting hip—for example, if the pelvis is allowed to sink into a left Trendelenburg tilt—the increased length of the medial lever, OA, can impose such strain on the abductors that even that "sleeping giant," the gluteus maximus, springs into action and adds the contracting force of its thick coarse fibres to M and therefore $R_1$. A similar increase in the downward thrust on the right femoral head results from a shortening of the lateral lever BO. If, as in a moderately severe valgus hip, it is a third its normal length, then $R_1$ will be $3 \times 3\,K_1 + K_1$ —that is, ten times the superimposed body-weight. Not even a normal hip can support such strain for long, and the patient must achieve some compensatory shortening of the medial lever OA. This he can only do in one of two ways. He can shift his body's centre of gravity to the supporting right side by tilting his pelvis and trunk to the right (and, incidentally, throwing considerable strain on his lumbar spine)—that is, he can limp. Or he can use a stick. PAUWELS estimated that, because of its long leverage, even a small pressure-force of 20 lb. exerted on a stick held in the left hand, can reduce the weight pressing on the right femoral head during the stance phase of walking from 380 lb. to 220 lb. in the average man; and the reduction is far more dramatic when the right hip is in valgus.

These simple mechanical principles can best be applied—and are most commonly ignored—in the treatment of fractures of the femoral neck. Their initial prognosis depends largely on the steepness of the fracture line.[3] The horizontal fracture line of the "abduction fracture" often heals without immobilisation. The steep near-vertical fracture line of the so-called "adduction fracture" (a misnomer, since the position of the fragments depends not on the direction but on the violence of the breaking force) imposes a constant shearing strain on the fragments both in a vertical and in an external rotatory sense.[4 5] To overcome this distracting force—recognised as one of the powerful causes of non-union by Sir ASTLEY COOPER more than




a hundred years ago [6]—PAUWELS advised "reklination" of the vertical fracture. By modern methods of internal fixation this can now be achieved by reducing and pinning the fracture in slight valgus; or, in MCNEUR's more elaborate technique,[7] by combining internal fixation with a measured subtrochanteric wedge osteotomy which converts the vertical fracture line into a near-horizontal one. There is no doubt, as BLOUNT says, that trochanteric and subcapital fractures unite more readily in slight valgus; "but there is a fallacy in this proposition." Reverting to PAUWELS's system of forces, the valgus position, which ensures rapid healing, also reduces the lateral lever BO and therefore increases $R_1$, the downward thrust on the femoral head. BLOUNT believes that this may be an important cause of avascular necrosis, a complication rarely seen when the normal angle between femoral shaft and neck is preserved.

Most surgeons insist that patients who have had fractured femoral necks should use some form of support for six to nine months. But, as GRAY [8] has lately reiterated, avascular necrosis is often a much later complication. "There may be a period of six, twelve, or eighteen months during which, provided the fracture has united, the patient will be able to walk with little or no difficulty. Then there is increasing pain and stiffness, and X-rays show that some collapse of the weight-bearing portion of the head has developed." The reason for this is that even when the fracture has converted the femoral head into a bloodless monument of dead osteoblasts, the outlook is not hopeless if sufficient time is allowed for "creeping substitution" [9] to take place around newly formed blood-vessels penetrating from the fovea. But a new collapse fracture is inevitable if weight is borne and support is discarded prematurely. Unfortunately, this happens all too often.

"We must educate doctors, patients, employers, and the general public to turn back to the old order and to look upon the walking stick as a good friend," BLOUNT declares; and this would certainly do much to improve matters. Many an injured workman today is not allowed to return to work so long as he needs a support (though he may limp with impunity); the

2. Pauwels, F. Der Schenkelbruch. Stuttgart, 1935.
3. Linton, P. *J. Bone Jt Surg.* 1949, **31B**, 184.
4. Eyre-Brook, A. L., Pridie, K. H. *Brit. J. Surg.* 1941, **29**, 115.
5. King, T. *Ibid*, 1939, **26**, 721.
6. Cooper, A. A Treatise on Dislocations and Fractures of the Joints. 1822. 4th ed., London, 1924.
7. McNeur, J. C. *J. Bone Jt Surg.* 1953, **35B**, 188.
8. Gray, C. H. *In* Modern Trends in Orthopædics. London, 1956.
9. Phemister, D. B. *Arch. Surg.* 1940, **41**, 436.

soldier is put to bed or encouraged to limp and "forget about the pain," rather than given a walking-stick; and presidents and lord mayors hobble behind the mace instead of using it (as many of their predecessors did) to relieve their arthritic hips. Pride often forbids the young man or woman to use a stick; and later in life, when most emotions have turned into symptoms, doctors rather than patients may be at fault. "You may discontinue the cane as soon as you feel strong enough"—BLOUNT quotes the surgeon who is too anxious to prove that the operation has been a success. He does not ask whether the femoral head is strong enough: often it is not; often it will hurt; often it will collapse; often it will never recover.

The renaissance of the stick calls for combined efforts. The orthopædic surgeon must preach the gospel, but the fashion expert must whisper the command. The sticks provided by hospitals today are often abominably ugly; and to buy one which is restful to the eye as well as to the hip is by no means easy. Sticks should be sold "like cars on the basis of novelty features," BLOUNT suggests. "Hidden swords are no longer permissible, but many cane accessories could be revived. Flashlights, bottles, umbrellas, and even built-in radios would be useful. Beautiful plastics could be combined with newer alloys in order to increase the sales appeal." The Edwardian gentleman of fifty years ago was not fully dressed without a cane; perhaps the Elizabethan gentleman of today could be persuaded to carry an attractive walking-stick. But surely the medical profession must set the example: a gift from Hermes himself, the stick has for centuries been the very symbol of our art: in our enthusiasm for modern appliances, we must not let it perish with indignity.

## Control of Systemic Lupus Erythematosus

THE "L.E.-cell phenomenon," originally described by HARGRAVES and his colleagues [1] in 1948, is now the basis for relatively simple techniques for detecting this diagnostic feature of systemic lupus erythematosus. In several centres many patients with this disease have now been treated; and DUBOIS, in Los Angeles, has himself studied 163 cases, on which he bases a timely review [2] of the course of the disease and the results of various forms of treatment. The introduction of the L.E.-cell test has been followed by a fourfold increase in the number of cases of systemic lupus erythematosus diagnosed, and the disease is now more common in his hospital than acute leukæmia, pernicious anæmia, or Hodgkin's disease. The sex-distribution reflects the known preponderance of females—89% of the 163 patients were female. Negroes, Mexicans, and 4 patients "of Oriental extraction" were also included and DUBOIS disagrees with the view that the disease is rare in the non-White races. The commonest age of onset was between 10 and 29 years, and nearly 58% of patients were in this group. The L.E.-cell test was the diagnostic criterion in 74% of patients, a biopsy was used in 13%, and in another 13% the clinical picture alone was adequate. But DUBOIS points out that it is not always possible to get a positive L.E.-cell test at the first attempt; it is often necessary to use more than one technique. He has used heparinised peripheral blood,[3] the clotted-blood method of ZIMMER and HARGRAVES,[4] and SNAPPER'S method [5] with a substrate of normal leucocytes. The main purpose of DUBOIS'S review is to assess what various forms of treatment can do to improve symptoms and the ultimate prognosis. One of the difficulties is that spontaneous remission is common, and in fact 38% of DUBOIS'S patients improved spontaneously. Nevertheless, he has been able to come to some useful conclusions about the value of antimalarial drugs, cortisone and its relations, and nitrogen mustard for the associated kidney lesions.

The use of antimalarial drugs for systemic lupus erythematosus is an extension, introduced by PAGE,[6] of the original use of mepacrine for discoid lupus. Mepacrine was given to 27 patients with moderately active systemic lupus erythematosus in an average maintenance dose of about 400 mg. daily (300–600 mg. daily according to severity); 21 patients were said to have benefited, arthritic changes and skin lesions being especially responsive. In 34 other patients mepacrine was combined with cortisone and in 27 of these the results were good; 9 were able to stop cortisone and later the mepacrine could also be discontinued. Other antimalarials that have been tried are chloroquine and camoquin, but neither is, on the whole, as effective as mepacrine. All these drugs may produce unpleasant side-effects when given for long, and mepacrine has the added disadvantage of staining the skin yellow. They all seem especially useful in mild cases in which skin and joint lesions predominate.

For the more seriously ill patient, administration of cortisone or its modifications is the most important treatment. The dose must be adequate to control the crises of systemic lupus erythematosus; the usual starting dose is 300 mg. of cortisone, 240 mg. of hydrocortisone, or 40 mg. of prednisone daily; doses of up to 4000 mg. of cortisone daily have been used temporarily. An adequate dose should bring the temperature to normal and improve symptoms. When, after a few weeks, the pyrexia and symptoms remain under control, the dose can be gradually reduced, the aim being to stop treatment altogether. But in no less than 54% of DUBOIS'S patients indefinite maintenance therapy was needed because the reduction of the dose below a certain level was repeatedly followed by recurrence. Out of 132 patients given steroids, 107 were improved: 49 patients were completely relieved and could be taken off steroid treatment; most of these patients needed about nine months' treatment. Relapses followed in 24 of these 49, mostly within six months of stopping treatment, but in 17 others there was no relapse during periods ranging from one to four years without steroid treatment.

Nitrogen mustard was described by DUBOIS [7] as a treatment for systemic lupus erythematosus with renal involvement. He has now used intravenous mustine and oral triethylenemelamine (T.E.M.), but T.E.M. was discarded because it was too toxic. Intravenous mustine was given in a single unusually large dose of

1. Hargraves, M. M., Richmond, H., Morton, R. *Proc. Mayo Clin.* 1948, **23**, 25.
2. Dubois, E. L. *Ann. intern. Med.* 1956, **45**, 163.
3. Dubois, E. L. *Arch. intern Med.* 1953, **92**, 168.
4. Zimmer, F. E., Hargraves, M. M. *Proc. Mayo Clin.* 1952, **27**, 424.
5. Snapper, I., Nathan, D. J. *Blood*, 1955, **10**, 718.
6. Page, F. *Lancet*, 1951, ii, 755.
7. Dubois, E. L. *Arch. intern. Med.* 1954, **93** 667.

20 mg. to adults after previous sedation. The patients who responded best were those who, after two months' treatment with steroids, still had nitrogen retention and œdema, though other manifestations of the systemic lupus were controlled. As DUBOIS points out, progressive renal failure, associated with increasing nitrogen retention, hypertension, and œdema, is one of the main causes of death in systemic lupus erythematosus, and, unless this progression can be stopped with nitrogen mustard, the outlook is bad.

The common causes of death in systemic lupus erythematosus are, firstly, uræmia and, secondly, arteritis or phlebitis affecting blood-vessels in the central nervous system. In 58 fatal cases of systemic lupus (33 adequately treated and 25 inadequately treated according to DUBOIS's standards) the cause of death was uræmia in 19 and a lesion of the central nervous system in 25. The signs of involvement of the central nervous system, such as convulsions, psychoses, and paralyses of various parts, usually fail to respond to any of the present treatments, including cortisone, and they are consequently very ominous. But DUBOIS's figures show convincingly that systemic lupus erythematosus is not so rapidly fatal as it is often thought to be. His series includes 138 adequately treated patients who have been ill for two years or more, and less than 10% of them died in six years. In 59 untreated or inadequately treated patients, the average duration of life was two years. Thus, there seems little doubt that treatment does prolong life, and cortisone or allied treatment is still the mainstay for acutely ill patients, 90% of whom can be expected to respond. DUBOIS suggests, however, that for the less acutely ill, milder measures should be tried at first; rest, salicylates, or antimalarial drugs can be used, and in this way cortisone and prednisone can be kept in reserve. This principle of minimum treatment has much to commend it.

# Annotations

## A NEW TEXTBOOK OF ANATOMY

THE medical curriculum, as most teachers and presumably all students are aware, makes undue demands on the student's capacity for learning facts. This is the first of two main reasons why six professors of anatomy have grouped themselves, under the editorial banner of Prof. W. J. Hamilton, to devise a new textbook.[1] Their objective of avoiding an over-abundance of topographical details would no doubt have appealed to the Goodenough Committee, which declared [2]:

"There is an urgent need in every school for a new viewpoint on the part of the teachers of the pre-clinical subjects and for the drastic elimination from the curricula, and therefore from the examinations in these subjects, of a mass of detailed information, which serves only to clutter-up the student's mind and to deaden his interest in subjects that can and should make the liveliest appeal to him . . ."

Subsequently the General Medical Council [3] remarked that if it should be found possible to shorten the course of instruction in dissection, this would help to improve the position described by the Goodenough Committee. Himsworth [4] is convinced that there is much truth in the contention "that it is this constant preoccupation in acquiring detailed knowledge which militates against the development of the student's capacity for thought." And Pickering [5] has succinctly observed that "there is no justification for the amount of anatomy that is taught in some schools."

On the whole the authors have succeeded well in avoiding a plethora of detail. The locomotor system, for instance, is considered (by Professor Hamilton and the late Prof. A. B. Appleton) in a single section. Wisely, the description of the separate bones of the skull and also of the carpal and tarsal bones is much curtailed. But, the preface having acknowledged the increasing tendency to emphasise the clinical significance of anatomical facts, it is disappointing to find in this section only four radiographs among over two hundred excellent figures. Indeed throughout the book there are few radiographs.

A second reason for producing this book is the need for closer correlation of the studies of structure and of function. (Up till the early 19th century anatomy and physiology were usually considered together; and Zuckerman and Gilding [6] have already told of their efforts at Birmingham University to heal the subsequent breach.)

The effort to break down the barrier is carried furthest in the sections on the central nervous system (Sir Wilfrid Le Gros Clark), the endocrine system (Sir Solly Zuckerman), and the cardiovascular and lymphatic systems (Prof. J. M. Yoffey), each of which is a major contribution.

Preclinical teachers may prepare students for their clinical work by enabling them to gain some factual knowledge and a grasp of scientific method, and to sharpen their powers of observation. In this early phase overweighty textbooks deaden the spirit of eager inquiry: reading this new volume from cover to cover can but fan the feeblest fire of enthusiasm. For purposes of reference the long-established textbooks will retain a respected place; but the effect of the approach to human biology in this latest book will be felt in medical schools throughout the world.

## RELAXIN

IT now seems to be generally accepted that Hisaw [7] was right in his view that relaxation of the symphysis pubis and pelvic ligaments in pregnancy is under the control of a special non-steroid hormone, to which he gave the name relaxin. This hormone (or group of substances, as it may well be) has been found in the serum of several animals during pregnancy; it is water-soluble, and it is believed to be a polypeptide. It can be obtained from the corpus luteum and the placenta of various animals and it has different but related actions in different species. Apart from its action on the pelvic ligaments, two other effects have been described in animals—namely, softening of the cervix uteri and relaxation or inhibition of uterine muscle. Its action on connective tissue seems to be mainly a dissolution or depolymerisation of the collagen.

Zarrow et al.[8] have studied the cervical softening which follows the administration of stilbœstrol and relaxin in castrated sows. They found that, after relaxin,

1. Textbook of Human Anatomy. By J. D. BOYD, M.SC., M.D., professor of anatomy in the University of Cambridge; Sir WILFRID LE GROS CLARK, M.D., F.R.C.S., F.R.S., professor of anatomy in the University of Oxford; W. J. HAMILTON, D.SC., M.D., F.R.S.E., professor of anatomy in the University of London (editor); J. M. YOFFEY, D.SC., M.D., F.R.C.S., professor of anatomy in the University of Bristol; Sir SOLLY ZUCKERMAN, C.B., M.D., F.R.S., professor of anatomy in the University of Birmingham; the late A. B. APPLETON, late emeritus professor of anatomy in the University of London. London: Macmillan. 1956. Pp. 1022. £5.
2. Report of the Interdepartmental Committee on Medical Schools. H.M. Stationery Office, 1944.
3. General Medical Council. Recommendations as to the Medical Curriculum. London, 1947.
4. Himsworth, H. *Lancet*, 1953, ii, 789.
5. Pickering, G. W. *Brit. med. J.* July 21, 1956, p. 113.
6. Zuckerman, S., Gilding, H. P. Proceedings of the First World Conference on Medical Education. London, 1954. See also Zuckerman, S. *Lancet*, 1947, i, 395.
7. Hisaw, F. L. *Physiol. Zoöl.* 1929, **2**, 59.
8. Zarrow, M. X., Neher, G. M., Sikes, D., Brennan, D. M., Bullard, J. F. *Amer. J. Obstet. Gynec.* 1956, **72**, 260.

a cervix previously resistant could easily be dilated. They cautiously suggest that cervical dilatation in labour may be explained by a dissolution of ground substance leading to such "watering-down" of the cervix as will allow "the passage of large objects" through it on applying pressure.

Because of its power to inhibit uterine contractions experimentally, Majewski and Jennings [9] used relaxin in 21 cases of premature labour with apparent good effect; but none of their patients was well advanced in labour (indeed, Eichner [10] denies that many of them were in labour at all) and in 2 cases with ruptured membranes progress was not halted. Eichner et al.[11] were able to stop labour completely in 2 cases by giving large doses intravenously, and this may represent a real advance in treatment, since there is no other certain method of arresting uterine pains. Eichner et al., also tried to influence induction in women with an unripe cervix by the preliminary use of relaxin. The cervix was considerably softened, but the results of induction were disappointing. In 3 cases of cervical dystocia, however, relaxin was successfully used: in all 3, labour pains were arrested, and when contractions began again delivery quickly followed without further treatment in 2 cases. Weinberg [12] described an investigation to decide whether relaxin, given for a short period, will bring about appreciable softening and separation of the symphysis pubis. Hopes of aiding mothers in trial labour by a "medical symphysiotomy" were not fulfilled; and X-ray examination showed no appreciable effect from the dose given. Relaxin has also been used to relieve primary dysmenorrhœa; and Rezek [13] and Jones and Smith [14] recorded approximately 70% success. Jones and Smith used what is called uterine relaxing factor (U.R.F.) which is "a small portion of relaxin separated electrolytically within a very narrow range." [10]

## BIOPSY AND BILIARY CIRRHOSIS

JAUNDICE is such a common and striking feature of liver disease that, as Movitt [15] puts it, "a mere glance at an icteric patient at once creates a diagnostic challenge." Apart from excessive hæmolysis, in the vast majority of jaundice patients the liver or its associated ducts are diseased; and the correct diagnosis can often be made on clinical grounds alone. But various laboratory tests of liver function may be needed to solve a clinically ambiguous case; and in a few patients the diagnosis may still be in doubt after the tests have been made. It is in these circumstances that biopsy is valuable; and, since the commonest unanswered question is whether or not to operate, biopsy is usually performed by aspiration through a needle designed for this purpose. It is well to appreciate its limitations, however, especially when it is used to differentiate cirrhosis secondary to extrahepatic biliary obstruction from the cirrhosis caused by chronic inflammation of the small intrahepatic cholangioles.[16]

Movitt [15] emphasises several differential points in the study of the biopsy specimen. In both these diseases plugging of the bile capillaries by inspissated bile may be conspicuous, but it is usually more pronounced in extrahepatic obstruction. Frank necrosis of liver cells, however, with spilling of bile pigment into the necrotic area to form the so-called bile lakes, is seen only in the secondary cirrhosis, and their presence is thus a certain indication of obstruction of the main bile-ducts. The distribution of the lesions may also prove helpful: bile-staining in primary biliary cirrhosis is usually periportal, and in the secondary cirrhosis damage is generally most severe in the central zones bordering the hepatic veins. Conspicuous proliferation of the bile-ducts in the portal triads is a common result of long-standing obstruction; but proliferation rarely results from primary inflammatory disease. Finally, in the cellular reaction in the portal tracts polymorphs are often present in association with extrahepatic obstruction; in cholangiolitis, on the other hand, lymphocytes, plasma-cells, and histiocytes predominate and polymorphs are absent.

Unfortunately, these histological features are not consistently reliable, and it is by no means extremely rare for biopsy to leave the diagnosis still in doubt. Sodium iodipamide ('Biligrafin') may help by displaying the extrahepatic bile-ducts [17]; but it may not work until the jaundice has cleared, and it can hardly be expected to eliminate the necessity for an occasional diagnostic laparotomy. Direct injection of radio-opaque material into the bile-ducts [18] is another possibility: Twiss and Oppenheim [19] found that this technique of "immediate cholangiography" was of "inestimable value in detecting obscure pathologic conditions such as strictures, intra-hepatic and extrahepatic, which may not be obvious at exploration." [19]

## A TEMPORARY SERVICE?

IN August, 1951, King Edward's Hospital Fund for London started a Hospital Personal Aid Service for the Elderly [20] in seven hospital groups of the South-East Metropolitan Region. Its aim was to help hospitals without an efficient geriatric service to keep some sort of control over their ever-increasing waiting-lists of elderly sick. After a general practitioner had asked for the admission of an elderly patient, the hospital medical staff might suggest a visit by a case-worker of the personal-aid service. A report [21] which the Fund has prepared explains the objects of these visits:

(1) To suggest to the hospital the priority, based on social grounds, of those who need admission.

(2) To inform the hospital of the home circumstances in support of the suggested priority and as a guide when discharge is considered.

(3) To suggest suitable alternatives to admission wherever possible in cases where the hospital decides it is unnecessary to admit.

The first two are humane objects and beyond criticism when a physician is unable to "see for himself." It is plain, however, that out of courtesy to the patient's doctor a physician must see these patients before the "hospital" can decide not to admit; a lay person cannot take this decision, and professional consultations over the telephone are apt to be unreliable. The suggestion of suitable alternatives to admission depends on accurate clinical assessment, and Vine [22] has lately discussed some of the difficulties that may commonly arise. These patients are often "borderline" and always potential hospital admissions; deciding how to keep them independent of a hospital bed calls for experience and judgment, and the geriatric physician, who advises his almoner, health visitor, or case-worker, can help to lay the foundation upon which the patient's future can be rebuilt.

Figures in the Fund's report show that out of 5668 patients visited no fewer than 2929 were removed from the waiting-lists by reason of death, admission else-

9. Majewski, J. T., Jennings, T. *Obstet. Gynec.* 1955, **5**, 649.
10. Eichner, E. *Brit. med. J.* Nov. 17, 1956, p. 1171.
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13. Rezek, G. H. *Amer. J. Obstet. Gynec.* 1953, **66**, 396.
14. Jones, G. S., Smith, F. *Ibid*, 1954, **67**, 628.
15. Movitt, E. R. *Ann. intern. Med.* 1956, **45**, 242.
16. See annotation, *Lancet*, July 21, 1956, p. 130.
17. *Ibid*, Sept. 8, 1956, p. 504.
18. Best, R. R., Hicken, N. F. *Surg. Gynec. Obstet.* 1937, **65**, 217.
19. Twiss, J. R., Oppenheim, E. Liver, Pancreas, and Biliary Tract. London, 1955; p. 71.
20. See *Lancet*, Aug. 18, 1956, p. 351.
21. Obtainable from King Edward's Hospital Fund for London, 10, Old Jewry, London, E.C.2.
22. Vine, S. M. *Lancet*, 1955, ii, 103; *J. Amer. geriat. Soc.* 1956, **4**, 859.

where, recovery, or refusal to be admitted. Of the 2739 remaining, 2164 were admitted, leaving 575, or about 20%, for whom other arrangements were made. The domestic, nursing, welfare and other help provided by local authorities varies throughout the country, but in general it can be said that, in areas where geriatric physicians are able to visit over 95% of patients referred to them, 40–50% benefit more from "other arrangements" than from admission to hospital. The inference is that visits should be clinical as well as social if unwarranted admissions are to be avoided.

The Fund's service for the elderly is making a great effort to compensate for serious deficiencies in our care of old people, and its value in many parts of the country would be inestimable. But such a service has really no place in a modern geriatric practice, and when the geriatric units in this country are adequately staffed and equipped, the service should no longer be needed. The King's Fund will then be able to look back with satisfaction on yet another accomplishment.

## RESISTANCE TO HORMONES

DURING the early investigations of the action of hormones it was noted that treated animals and patients often went into a refractory state in which they did not respond to hormones. The hormones concerned were usually proteins, protein-bound, or contaminated with inactive proteins of the donor animal, and they were mainly trophic hormones of the anterior pituitary gland; but occasionally resistance to steroid adrenocortical hormones developed.[1] The nature of this acquired resistance was intriguing and is still not completely elucidated. Moebius [2] observed in the serum of thyroidectomised sheep a substance which was antagonistic to thyroglobulin. Sharpey-Schäfer [3] postulated the existence of substances which inhibited the action of special hormones and he called them "chalons" (χαλάω, I yield to). The first thorough research on substances neutralising hormones was carried out by Collip and his school [4–8]; and Collip introduced the term "antihormones," which is now in general use. His work prompted a great many papers, which were reviewed by Thompson [9] in 1941. Collip did not regard these substances as antibodies in the immunobiological sense; they were more like hormones. They were supposed to regulate the balance between hormones and they were likened to cholinergic and adrenergic compounds.[10] Each hormone was thought to have an antihormone, and the antihormone theory was related to the principle of inverse response.

The immunological concept of antihormones was put forward by Bauer and his associates [11 12]: they demonstrated complement-fixing antibodies in rabbits treated with chemically pure thyroxine and in patients with hyperthyroidism; but resistance to thyroxine could not be transmitted with the serum which contained these antibodies. Roitt et al.[13] have lately demonstrated organ-specific precipitating antibodies in the serum of 2 untreated and 4 thyroxine-treated patients with Hashimoto's goitre. The antibodies disappeared slowly after thyroidectomy. Positive complement-fixation tests have also been recorded with the serum of patients with spontaneous hypoglycæmia when insulin was used as antigen.[14] At least some of the antibodies seem to be distinct from antihormones and to be unrelated to the process of acquired hormonal resistance. Thus, Eichbaum et al.[15] have shown that complement-fixing antibodies which developed in rabbits injected with anterior-pituitary-like urinary substance did not neutralise the hormone; precipitin and complement-fixing antibody may later disappear and the serum may still have a hormone-inhibitory action. On the other hand, the well-known acquired resistance to parathyroid hormone is, according to Taylor et al.,[16] not associated with the appearance of true antibodies in the serum; this may be due to the presence of sessile antibodies. The antihormones seem, in fact, to be a peculiar type of antibody, different from those with which we usually deal in serology. Some retain their animal specificity; others are non-specific, but act on all proteins with the specific effective hormonal group. Maddock et al.[17] observed such antibodies against gonadotrophic pituitary hormones, and they acted against the patient's own gonadotrophic hormones. These substances may be compared with the antibodies against iodinised proteins [18] and against azo-conjugated proteins.[19] Others are antagonistic against hormones from several but not all animals. Thus, Molloney and Coval,[20] who used crystalline insulin with adjuvants, induced in guinea-pigs non-species-specific antibodies which, however, did not neutralise the guineapig's own insulin.

Theoretically, resistance to the action of a hormone may be due to several causes. It may be an inborn refractory state of the target organs, such as that suggested by Albright in pseudohypoparathyroidism [21]; it may be acquired in the form of true antibodies with animal specificity, antibodies against the effective group (with loss of animal specificity), or antibodies against contaminating proteins. Of practical importance is the clinical observation that acquired resistance and often a simultaneous hypersensitivity are most commonly seen when the hormone preparation has not been highly purified. West [22] describes 51 patients with rheumatoid arthritis who were treated over a period of three years with with one or several of seven different corticotrophin preparations. Adrenocortical stimulation was assessed by estimating the urinary 17-ketogenic steroids or 17-hydroxyketosteroids. At the beginning of the treatment the adrenal cortex was stimulated in all patients and there was never any evidence of exhaustion of adrenals. 42 patients later became resistant to one or more preparations; 13 of them were resistant to two preparations and 1 to as many as six. Patients who became resistant against one preparation and responded to a second one may later be resistant to both preparations. Allergic reactions appeared in 17 patients; but acquired resistance was not necessarily associated with a positive intradermal test. The reactions, which may be severe,[23 24] were due to the contaminating or carrier proteins; and it seems that if pure adrenocorticotrophic hormone does in fact ever induce sensitivity, it does so very rarely.


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## Special Articles

# PUBLIC OPINION AND MENTAL ILLNESS *

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As a member of the Royal Commission which is at present considering whether any changes should be made in the laws relating to mental illness and mental deficiency, I cannot say anything about the conclusions we have reached. But something may usefully be said, I think, about the relation of these laws to public opinion, and the way in which public opinion affects the care of the mentally ill.

Laws embody public opinion as it is at the time when they are made. In general they are likely to be changed only when public opinion has changed, and on the whole it is a good thing that the law should be rather slow to change. We must be sure that a change in public opinion is substantial, and that it has come to stay, before we can regard it as an adequate ground for an alteration in the law.

Public opinion is itself complex because it contains a number of ingredients. In the case of mental illness there are the views of doctors; but doctors again are of many kinds. First and foremost naturally come the psychiatrists whose work lies in this field; but there are other kinds of specialists who are closely interested in it, and then there are the general practitioners whose importance in the treatment of mental disorder can hardly be exaggerated. There is the army of skilled workers who render help in one way or another to the mentally sick—the trained mental nurses, the psychiatric social workers, the duly authorised officers, and the occupational therapists, to mention only some. The law is involved with mental illness in many ways. Magistrates are concerned not only with the legal process of certification of the mentally ill, when that is necessary, but in their day-to-day work in court they frequently have to consider the importance of psychological factors in relation to criminal offences, and their decisions on these points may have profound and far-reaching effects upon human happiness even though they may not often gain the publicity which illuminates debates on the McNaughten rules in some cases of murder. And I must not leave out the school-teachers, who meet with psychiatry as well as psychology in some of their educational problems, nor the clergy and ministers of religion who encounter it in their pastoral work. And of course I must include those who, on boards of governors, regional hospital boards, or management committees, are responsible for mental hospitals, mental-deficiency institutions, and departments of psychological medicine in general hospitals. And that leaves the vast mass of the public, most of whom perhaps have no contact with, nor particular interest in, mental illness, but who include the patients in our mental hospitals and their relatives and friends. Even though the mass of the public may have no very direct contact with mental illness, they can hardly help being to some extent psychiatry-conscious when the radio, the cinema, and the theatre all frequently deal with the dramatic problems created by psychological disorders—when the psychiatrist, willy-nilly, has become the target for some of those public emotions which in the past have been directed to the heroes, or sometimes the villains, of mythology.

Two things emerge from this survey of the composition of public opinion concerning psychological medicine. The first is that it indicates how greatly the influence of psychiatry, both upon the individual and upon social life, has grown during the last twenty-five years. The other takes the form of a question, or rather perhaps two questions. How is public opinion about psychiatry influenced, and what are the factors which have brought about such a change in it during recent years?

I think if I try to answer the second question I shall, in the process of doing so, largely have answered the first.

### PHYSICAL TREATMENT OF MENTAL DISORDER

One great factor which has profoundly changed our attitude to mental disorder is the discovery, during the last quarter of a century, of the value of various physical methods of treatment. It has often happened in medicine that some form of treatment has been found to be effective long before its mode of action has been understood. The use of quinine for malaria, and of digitalis for heart-failure, are good examples of this. So it has happened in psychiatry that various physical, pharmacological, and surgical methods of treatment have been found to be of great value in suitable cases, and the empirical discovery of their usefulness has led to researches of great importance for our understanding of the physical basis of the mind. This generation has been rich in therapeutic discoveries which would have seemed like miracles to our predecessors, and none have been more dramatic than the use of modern methods of treatment to restore quite rapidly to normal health a person suffering from severe distress of mind, which in the past must have been left to take its own course, and who possibly might never have recovered at all. The effect of these new methods of treatment upon the public attitude to mental disorder has been increasingly to make people realise that the mental illnesses which can be treated in this way must have a physical basis, which will ultimately, we hope, be explained in the same sort of terms as we use to explain other nervous diseases, or even perhaps diabetes.

### ATTITUDE OF SOCIETY

Mental disorders give rise to symptoms which are distressing both to the patients and to their friends, and sometimes of such a kind as to necessitate some restraint of the patient's liberty. But, in the past, the whole attitude of society to mental illness has been one of distress and fear, greatly amplified by the fact that mental illnesses appeared to be mysterious, in a class apart from physical illnesses, and to a large extent uncontrollable by the methods of treatment applicable to bodily disorders. The second revolution in our thought about the mind has been the discovery that this is not true. An interesting illustration of the difference which a knowledge of the causation of mental disorder makes to the attitude to the sufferer is provided by the familiar condition of delirium. Patients suffer from delirium as a result of various severe physical illnesses, and in delirium may exhibit almost any of the mental symptoms of a severe psychological illness. Yet patients with delirium are nursed every day in our general hospitals and many people would be surprised if they were said to be suffering from mental disorder. Their treatment usually presents no particular difficulty, and when they have recovered no stigma attaches to them for having developed mental symptoms. The main reason for this surely is that delirium is regarded as a symptom of a physical illness which we understand and usually can treat. Increasingly research is bringing all mental disease into this category.

There is yet another class of patients whose existence in increasing numbers in the community is, I am sure, changing the attitude of society to mental disorder. I refer to those aged or elderly people who, as they grow older, develop some symptoms of psychological abnormality. Mental illnesses in the aged give rise to difficult problems. Old age naturally confers no immunity against many of the mental disorders which may occur earlier in

* From an address in opening the new department of psychological medicine at the Newcastle General Hospital. An account of the department appears on p. 1150.

life, and these may require the same treatment as at other ages. Apart from this, however, we know that some old people develop failure of intellect and disturbances of behaviour which are due to various forms of degeneration of the brain, and it is widely felt that it should often be possible to make provision for the care of such people outside a mental hospital. I am not now concerned to discuss the merits of this particular proposal: all I want is to stress that the existence of this group of people, and in growing numbers owing to the increasing age of the population, has brought to public notice another instance of a mental disorder which is suitably regarded as a by-product of physical illness.

### THE NEW OUTLOOK

It is only against this background that we can fully appreciate the importance of the opening of the new department at Newcastle. We welcome it, first, as a psychiatric department in a general hospital; and from what I have said you will understand why I regard that as symbolising, and, indeed, embodying, all the revolutions in this sphere which have taken place during the last quarter of a century. I am sure that it is in the spirit of the times to aim at treating in a general hospital any patient suffering from any mental illness who can benefit from treatment, for whom the facilities are available, and whom the law, as it now is, or as it may in future be amended, will permit. I am convinced that, subject only to the necessary legal restrictions, there should be no difference in the treatment of patients whose illness produces physical symptoms, and those in whom it causes mental disturbances.

In the past we have sometimes suffered from over-rigid preconceptions. Some have been so preoccupied with psychology that they have refused to look at physical causes: others have felt that physical causation explained everything. Today there is a liberating philosophy which allows us to make the best of both worlds. Workers in this new department will study the influence of body on mind, and of mind on body, and not least that of mind on mind, in the service of men, women, and children, and through them and beyond them of humanity as a whole.

## PSYCHOLOGICAL MEDICINE AT A GENERAL HOSPITAL

### New Psychiatric Unit at Newcastle

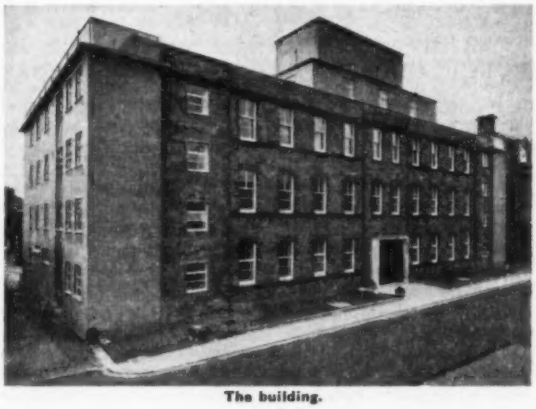
FROM A CORRESPONDENT

THE past 25–30 years have seen revolutionary changes in the care of the mental patient. The prison-like establishment for custodial care is being replaced by an active therapeutic centre where an atmosphere of hope and progress prevails.

This period has also seen a rapid demolition of the barriers between medicine and psychiatry. Outpatient psychiatric departments have sprung up in general hospitals everywhere, bringing psychiatrists into closer relationship with their colleagues in other branches of medicine.

The inpatient psychiatric unit, within or close to the general hospital, is a more recent development. It has evolved because many patients with psychiatric disorder do not need segregation from the community, and because many who require treatment fear to present themselves at a mental hospital where (despite the many striking improvements) a large proportion of the occupants are chronic patients with little hope of ever returning to ordinary life.

These inpatient units are likely to play a significant part in integrating psychiatry with general medicine, and an important step in this development was taken when, on Nov. 3, Sir Russell Brain opened a new psychiatric unit of 54 beds at the Newcastle General Hospital. This brought to fruition a scheme conceived in 1948 when the Newcastle Regional Hospital Board adopted a policy for providing modern psychiatric units in the larger general hospitals.



The building.

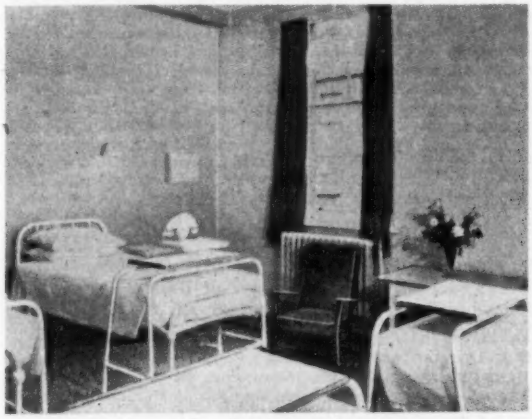
### THE UNIT

The new unit occupies a remodelled three-storey building at the Newcastle General Hospital, which formerly housed, on its ground floor, 12 beds for men and 13 beds for women admitted under sections 20 and 21 of the Lunacy Act. The outer shell of this 50-year-old building and its imposing Victorian facade still stand; but its end wings have been demolished and rebuilt in brick, an additional storey has been erected over the main building, and the whole interior has been adapted. The architects have created an interior refreshing in its lightness and charm, decorated and furnished in contemporary style. The wards contain one, two, or four beds, and, although 15 beds remain for section-20 cases on the ground floor, differences in the arrangements for these patients are few and unobtrusive.

There are two spacious, tastefully furnished, day rooms; a quiet room; a dining-room; and two large rooms equipped for occupational therapy and handicrafts. On the first floor is an insulin unit, treatment and preparation rooms for electroconvulsion therapy, and a specialist's consulting-room. There are five interview rooms in various parts of the building. The object has been to create an environment different from that of either the general hospital with its emphasis on beds, or the old-fashioned mental hospital with its large dormitories. A compromise between the need for privacy and the need for social activity has been achieved while maintaining a warm home-like setting.

The new unit and the associated large outpatient department are under the clinical direction of Dr. Martin Roth, professor of psychological medicine in the University of Durham. The medical staffing for the two units at present remains as it was when the old unit of 25 observation beds was functioning; but it is expected that additional appointments will be made to the existing posts which comprise ten weekly consultant-psychiatrist sessions, a maximum-part-time consultant psychotherapist, a senior registrar, a registrar, and a senior house-officer. In addition, the establishment allows for a clinical psychologist, two psychiatric social workers (and one trainee) and an occupational therapist. The nursing staff consists of an administrative sister, a senior sister, four staff nurses and twelve students or State-enrolled assistant nurses. Other staff includes three clerks, seven domestics, and a porter.

The new unit will be a valuable adjunct to the facilities for teaching—undergraduate and postgraduate—provided by the University of Durham's department of psycho-



In a four-bed ward.

logical medicine. By arrangement with the regional board, registrars are seconded to this department for a period of training, and the unit will give excellent opportunities for clinical teaching. Through the university department there are other links with the mental hospitals in the region, particularly with St. Nicholas Hospital in Newcastle with whose medical staff clinical meetings and other activities are conducted jointly.

The building has a psychological laboratory and equipment for electro-encephalography which are to be used in the clinical research it is hoped to undertake in the unit. Teaching and research were from the beginning planned to play an important part in its activities.

### THE BACKGROUND OF IDEAS

The establishment of such units is symbolic of the radical change during recent years in our concept of psychiatric services. In Denmark this change has found expression in an imaginative plan for mental hospitals with a maximum of 400 beds which in future will always be located close to the community and in the same grounds as the general hospital. In Holland the resourcefulness and energy of Querido's example has revealed unsuspected possibilities in the community care of the mentally sick. These developments—which are but natural extensions of the psychiatrist's assumption that, if treatment is to be effective, the whole human situation created by illness must have attention—are helping to dethrone the hospital bed from its dominant position in medical thinking. The impact of these trends upon the staffing, the pattern of life, and the architecture of the modern psychiatric hospital has been considerable. Such an orientation towards the home and community is shown at the Newcastle General Hospital by the spacious psychiatric outpatient department (in a separate building), by the presence of two psychiatric social workers on the staff, and by the ample occupational and recreational facilities of the new unit, which should in future be able to accommodate a certain number of patients on the day-hospital system, as well as those who are resident.

But if it has something of such a philosophy to contribute to the general hospital it is now re-entering (it was only in 1860 that the "lunatic ward" at Guy's Hospital was closed), the psychiatric department has at least as much to gain. Scientific investigation of mental disorder is still in its infancy. Schizophrenia remains the main cause of chronicity in mental hospitals, as it was 50 years ago. Such methods of treatment as have been introduced remain largely empirical, and even in the depressive psychoses, in which treatment is often strikingly successful, the high relapse-rate detracts from the victory that has been achieved. The immense possibilities foreshadowed by methods such as electroconvulsion therapy and insulin coma remain to be realised. Only fundamental advances in knowledge are likely to change the situation. And the example of what has been done in general medicine, by the application of scientific method, in the way of precision, elegance, and efficacy of diagnosis and treatment is both a challenge and a stimulus to psychiatry.

### COLLABORATION

At the Newcastle General Hospital psychiatry resumes life in a hospital of 838 beds which has departments of neurology and a neurosurgical unit of some renown. A new neuroradiological unit is under construction, and only a few weeks ago Sir Harold Himsworth opened a splendid modern institute of pathology there. The possibilities for collaboration between psychiatry, adjoining specialties, and other branches of medicine are therefore particularly favourable.

In coming years, units such as this should help to work out the best relation between the mental hospital and the general hospital psychiatric department. Experience in Scandinavia suggests that their rôles tend to be complementary. There is so far no evidence from there that establishment of a general hospital unit is followed by a reduction in the number of beds required at mental hospitals; but in the Newcastle region, where all such hospitals are seriously congested, the new unit should help to relieve the overcrowding that is retarding progress.

We are hoping that much good may come of this joint venture by a university, a regional hospital board, and a teaching hospital, permitting harmonious integration of clinical practice with teaching and research.

The conversion of the building was done by Messrs. Scherrer and Hicks, F.F.R.I.B.A. in collaboration with the regional architect, Mr. P. H. Knighton, A.R.I.B.A.

The initial planning of the unit was undertaken by Prof. Alexander Kennedy; and Prof. Martin Roth, his successor, advised on the final details. Dr. T. Hurley, the regional psychiatrist, has given advice on both the planning and the execution of the project.

## GENERAL MEDICAL COUNCIL

AT the opening of the council's 193rd session on Nov. 27, Sir DAVID CAMPBELL, the president, discussed the Medical Act, 1956, which received the Royal Assent on Nov. 5, and which will regulate the constitution and functions of the council and the whole procedure of medical registration and discipline, from Jan. 1, 1957. The council had reason to congratulate Parliament on the admirable arrangement and clarity of the Act. Beyond question it was immeasurably superior for the council's purposes to the score of statutory provisions, ranging over a period of nearly a century, which it now superseded. Nowhere, perhaps, were the advantages of consolidation more apparent than in part II of the Act, which dealt with the medical education and registration of persons qualifying in England, Wales, Scotland or Ireland. The primary task of the council was, and always had been, Sir David said, that of creating or sustaining a sufficiently high standard of medical education in these islands. No doubt they had been helped by many developments in the country as a whole, and notably by the increasing vigour with which universities, both old and new, had applied themselves to the education of medical students. Nevertheless, the council might fairly take some credit for the great advances which had taken place since 1858 in this, their primary field of activity.

The president drew particular attention to the words of the Act which would in future constitute the basis of the council's disciplinary jurisdiction. This section provided that if any fully or provisionally registered person "(*a*) is convicted by any court in the United Kingdom or the Republic of Ireland of any felony, misdemeanour, crime or offence, *or* (*b*) after due inquiry is judged by the Disciplinary Committee to have been guilty of infamous conduct in any professional respect, the Committee may if they think fit direct his name to be erased from the Register."

The council's curriculum committee had now prepared new draft recommendations and had circulated these to licensing bodies and schools together with an explanatory memorandum setting out the principles which, in their opinion, should determine the form and substance of the new recommendations. The memorandum and draft recommendations merely reflected the provisional opinion of the curriculum committee, and did not in any way express a policy discussed and approved by the council as a whole. Sir David hoped that licensing bodies and schools would offer their comments on the recommendations not later than Jan. 31 next year. The committee expected to be able to submit their final report to the council at their session next May.

It was now four years since the council published the first edition of the list of hospitals in the British Isles which had been approved by licensing bodies for the house-officer service required under the Medical Act, 1950, and two years since the second edition was published. A year ago the council issued a list showing the variations in approved hospitals and recognised posts which had been notified to them by licensing bodies during the preceding twelve months. Since then the rate of change in approved hospitals and recognised posts had not diminished appreciably, and at the beginning of November a new list was issued, showing the variations notified to the council between October, 1955, and October, 1956. This revealed a net increase during this period of 7 in the number of approved hospitals in the British Isles. The number of recognised posts had also increased, in medicine and its specialties by 27, in surgery and its specialties by 23, and in midwifery by 7. There were now 749 approved hospitals in the British Isles, with 1273 medical posts, and 1542 surgical posts. In addition there were 370 posts in midwifery and 23 which provided mixed experience.

## THE REMUNERATION CLAIM

THE secretary of the Ministry of Health has sent the following letter to the secretary of the Negotiating Committee:

Dear Dr. MACRAE,

On 12th September a memorandum was submitted setting out further particulars of the Negotiating Committee's views on the legal aspects of the claim for increased remuneration.

I am instructed to say that this memorandum has now been fully examined. Ministers remain of the opinion that no contractual obligation such as has been alleged by the Negotiating Committee exists and that no action based on such a claim could succeed. If the Committee are not prepared to accept Ministers' views as to this, no doubt the matter can be brought before the courts for adjudication.

Yours sincerely,
JOHN HAWTON.

Sir John Hawton's letter was received on Nov. 22, and was considered at a meeting of the Negotiating Committee on Nov. 28.

# Public Health

## "WINTER VOMITING DISEASE" WITH MENINGEAL INVOLVEMENT

### AN OUTBREAK IN A CHILDREN'S HOSPITAL

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THERE are many minor illnesses, of obscure cause, which are seldom seen except in general practice. One group of these infections has been called "winter vomiting disease" or "epidemic nausea and vomiting" because the reported outbreaks have occurred in epidemic form, often in institutions during the winter. The main symptoms are nausea and vomiting, headache, and vertigo.

This paper describes a hospital outbreak in which the cerebrospinal fluid was abnormal, and in which serological tests for infection by nine groups of viruses gave negative results.

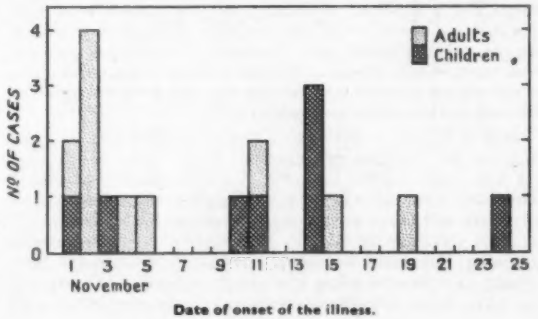
### Observations

Last November at the Sheffield Children's Hospital there were 18 cases—8 in children and 10 in doctors and nurses. On Nov. 1 a child and an adult were taken ill, and next day there were 4 more cases in adults. The last case was on Nov. 24 (see figure).

*Clinical Picture*

Characteristically, the illness began by the patient waking in the early morning and vomiting. Sometimes the vomiting was so sudden that he had no time to get out of bed before it happened. Most adult patients complained of nausea and some of upper-abdominal pain or discomfort. Headache was noticed early in the illness and was usually localised to the frontal region, but 3 adults had severe occipital headache. Some of the babies may also have had this symptom, if one can judge by their irritability. Vertigo was a prominent symptom from which all the adults and 1 child suffered. It was noticed particularly on turning the head quickly or closing the eyes. All the children had fever and in 2 of them 103°F was recorded. Only 2 of the adults had their temperature taken and in neither was it elevated, though several others felt hot and feverish. There were no other physical findings. 4 patients complained of drowsiness and 1 had mild diarrhœa (see table).

The illness usually lasted two to five days, but 3 of the children were ill for only one day and in 3 adults the main illness lasted seven, eight, and ten days. 2 patients had relapses after the initial illness had subsided.



THE SYMPTOMS FROM WHICH THE BABIES, OLDER CHILDREN, AND ADULTS SUFFERED

| Symptoms | Babies under 18 months | Older children | Adults | Total |
|---|---|---|---|---|
| Vomiting | 5 | 3 | 6 | 14 |
| Nausea | .. | .. | 7 | 7 |
| Headache | .. | 2 | 9 | 11 |
| Vertigo | .. | 1 | 10 | 11 |
| Fever | 5 | 3 | .. | 8 |
| Abdominal pain | .. | 1 | 4 | 5 |
| Drowsiness | 1 | 1 | 2 | 4 |
| Back pain | .. | 1 | 2 | 3 |
| Relapses | .. | .. | 2 | 2 |
| Diarrhœa | .. | .. | 1 | 1 |
| Total no. affected | 5 | 3 | 10 | 18 |

One of them had three relapses, with nausea, abdominal pain, and occipital headache recurring at weekly intervals and lasting a couple of days.

With 2 exceptions all the cases were connected with one ward—a general medical ward of 22 beds. Of the exceptions, one was a nurse working in a ward directly above the one in which the main outbreak took place. The other (case 3) was a patient in a ward in a separate part of the hospital, but she was under the care of the same doctors as the other affected patients, and who themselves contracted the illness.

Lumbar punctures were done on 3 children, and all were found to have changes in the cerebrospinal fluid (C.S.F.), though none of them had any signs of meningitis.

**Case 1.**—A boy aged 14 months was admitted on Oct. 19 with pneumococcal meningitis. He was treated with penicillin and sulphadimidine and responded satisfactorily, apart from the complication of a transient hemiplegia. After two weeks' treatment he was afebrile, his C.S.F. was normal except for the protein content, and the drugs were stopped. Two weeks later, on Nov. 14, his temperature suddenly rose to 101°F and he vomited. He looked pale and was very irritable. Next day he was still vomiting and feverish. There were no abnormal physical signs but a lumbar puncture was done because of possible recrudescence of the meningitis; the C.S.F. contained 1024 leucocytes per c.mm. (593 polymorphs and 431 lymphocytes), the protein was 100 mg. per 100 ml., and the sugar 32 mg. per 100 ml. The fluid was sterile. Because of the C.S.F. changes, and before the culture report was received, penicillin and sulphadimidine were restarted. The next day his temperature was normal and he seemed quite well again. The C.S.F. was not re-examined.

It is very unlikely that the return of cells to the C.S.F. was caused by a relapse of the pyogenic meningitis because the fluid was sterile, his illness was very brief, and his symptoms were similar to those of the patients who were suffering from the epidemic illness.

**Case 2.**—A boy aged 5 years was admitted on Nov. 7 for treatment of chronic constipation. On Nov. 14 he vomited several times, and complained of severe frontal headache which made him cry. There were no abnormal physical signs. Next day his temperature rose to 101·6°F; he vomited twice, and was drowsy and had a poor appetite. On Nov. 16 his temperature fell to normal, but he still complained of headache. On Nov. 17 his condition was unchanged and there were still no abnormal physical signs, but a lumbar puncture was performed and the C.S.F. contained 150 leucocytes per c.mm. (126 lymphocytes and 24 polymorphs). The protein and sugar were normal and the fluid was sterile. The day after the lumbar puncture he complained of slight cramp in his leg but was otherwise quite well.

**Case 3.**—A girl aged 12 years was admitted on Nov. 8 with acute nephritis. She was in a different ward from the other cases but under the care of the same doctors. After a few days in hospital her urine cleared of macroscopic blood and she remained symptom-free until Nov. 24 when she complained of anorexia, headache, and vertigo. Later she vomited once and complained of upper-abdominal discomfort. Her temperature rose to 99°F. Her urine again contained macroscopic blood. Next day she was better and afebrile. There were no abnormal physical findings, but in view of the abnormal fluid found in the other 2 cases, her C.S.F. was examined and found to contain 866 leucocytes per c.mm. (mostly polymorphs). The protein and sugar were normal. Three days later she was quite well and free from symptoms.

*Virus Investigations*

Single serum-specimens from 4 cases and paired serum specimens from 12 cases were examined by complement-fixation tests using antigens for the viruses of: influenza A, B, and C; lymphogranuloma venereum and Q fever; lymphocytic choriomeningitis; adenovirus (A.P.C.); poliomyelitis types 1, 2, and 3; and Coxsackie types A1, A2, A3, A9, B1, B2, B3, B4, and B5. Though virus-antibody was detected in some specimens, there was no diagnostic rise in antibody for any virus. No *Streptococcus MG* agglutinins were found. One specimen of fæces and two throat swabs yielded no virus in monkey-kidney tissue-cultures.

## Discussion

Outbreaks of "winter vomiting disease" or "epidemic nausea and vomiting" have been reported in this country, by Miller and Raven (1936), Gray (1939), Bradley (1943), Silverton (1952), Webster (1953), and Goodall (1954); in America, by Reimann et al. (1945); and in Denmark, where two outbreaks in 1935 were reported by Rischel and Henningsen (quoted by Miller and Raven 1936). Probably, however, the disease is commoner than the published accounts would suggest. Because it is a relatively benign illness of short duration, many sufferers probably hesitate to seek medical advice, and it is likely to be ascribed to "gastric flu." Gray (1939) and Bradley (1943), for instance, showed that the epidemics in schools which they investigated were only the local manifestations of an illness common in the community at the time, and Goodall (1954) found many patients in his practice who would not ordinarily have consulted him. We also have some evidence that there were many other cases in Sheffield at the time of our hospital outbreak.

It is unlikely that all the published reports describe the same clinical entity, for there is so much variation in the different epidemics. For instance, diarrhœa was common in the outbreaks in Denmark and in those described by Reimann et al. (1945), but was absent in those reported by Miller and Raven (1936) and Silverton (1952), and mild in the others. Headache was not mentioned by Miller and Raven but was recorded by the other authors, and vertigo was not a prominent symptom in the cases of Reimann et al. and Goodall (1954). Only 1 of our patients had diarrhœa, whereas headache and vertigo were complained of by almost all our adults. The epidemics which Zahorsky (1929) described under the name of "winter vomiting disease," the main symptoms of which were diarrhœa and vomiting, bear little similarity to our outbreak which seems to resemble most closely those described by Bradley (1943) and Webster (1953).

No causative organisms were isolated in any of the reported epidemics and most of the authors felt that the outbreaks they described were not caused by a gastro-intestinal infection by bacteria. Miller and Raven (1936) ascribed their epidemic to an infection of the central nervous system rather than of the alimentary tract, because of the suddenness of the onset of vomiting, the vertigo, and the absence of fever in their cases. This possibility was later supported by Gray (1939) and Reimann et al. (1945). One of the cases the latter authors described was suspected of having meningitis, but there is no record of a lumbar puncture. The prominence of headache and vertigo in our cases, and particularly the pleocytosis in the C.S.F. in the 3 patients in whom lumbar puncture was performed, leave little doubt that the illness primarily affected the central nervous system. Judging by the severity of their head-

ache, many of our other patients' may also have had meningitis.

Vertigo and vomiting are the chief symptoms of a syndrome that has been called "epidemic vertigo," an outbreak of which has recently been recorded in the Sheffield area by Leishman (1955). Headache, however, is not prominent in this illness, and none of our patients had the oculomotor abnormalities often found in epidemic vertigo. Leishman described slight increase of the protein in the C.S.F. in 2 of his 5 cases, but there was no pleocytosis.

Though vomiting may be a feature of illnesses caused by the known respiratory viruses, there was no evidence that these viruses played any part in our cases. Poliomyelitis viruses often cause meningismus, but there is no reason to believe that they were responsible for our outbreak, since 80–90% of cases of paralytic poliomyelitis give positive results in the complement-fixation test used by us (Tyrrell, Balducci, and Zaiman—in preparation.) Coxsackie-virus infections may give rise to illnesses in which vertigo and vomiting occur (Johnsson 1955) but the antibody distribution among our cases suggested only the acquisition of immunity with increasing age, and in no case was there a diagnostic rise in complement-fixing antibodies. Enteric cytopathogenic human orphan (E.C.H.O.) viruses (Committee 1955) are associated with aseptic meningitis; but the only practicable method at present of detecting infection with these is by culture, and it is clear that our tests did not exclude their presence in this epidemic. On another occasion we would inoculate C.S.F., throat swabs, and fæces from every case into tissue-cultures.

**Summary**

An outbreak of "winter vomiting disease" among patients and staff in a children's hospital is reported. There were 18 cases, 8 of them in children.

The main symptoms were headache, vomiting, and vertigo. Though no patient showed physical signs of meningitis, pleocytosis of the C.S.F. was found in all the 3 children who had lumbar puncture. This indicated that the illness was primarily an affection of the central nervous system.

Serological tests for nine groups of virus infections were negative.

The outbreak is compared with similar ones which have been reported.

We are grateful to Dr. T. Colver for permission to study and report on the patients, who were under his care; and to Dr. Colver, Dr. J. L. Emery, Prof. C. H. Stuart-Harris, and Dr. G. S. Wilson for helpful criticism. We also thank Dr. E. H. Gillespie for advice and Mr. N. V. Saxby, F.I.M.L.T., for technical assistance.

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## Problem Families

Despite all our efforts to help families in difficulties, "we will be left with a residuum of families who need 'propping'—the morally lame, halt and blind in whom we fail to inculcate any desire to improve." In his annual report, Dr. Llywelyn Roberts, medical officer of health for Sheffield, goes on to say that we must accept these people as our responsibility and "in particular we must see that the children are given any chance they can take to shed the carapace of sloth and inertia they so often inherit." On a later page of the report, Dr. Catherine Wright urges "vigorous rethinking" about these families.

"We should reconsider the meaning of the terms 'child neglect' and 'deprivation' and ponder whether deprivation in a vicious and filthy home may not after all provide a child with a worse background than Local Authority care, whether a child who clings to a neglectful mother may not do so simply for lack of an alternative. We should consider whether our knowledge of the supreme importance to a child of mother love has not become a too comfortable doctrine to cover our laissez-faire attitude to child neglect. We are trying too hard to keep some of the worst families intact. When a family breakup can be seen to be ultimately inevitable, if it be sooner rather than later, need it be regarded as the eighth deadly sin?"

The number of such families will not be noticeably reduced for several generations, Dr. Wright adds, "but the many influences which help to raise our social standards will not leave them untouched." "It will be well if, while we are carrying out the patching and mending, we give some attention to the roots."

# Medicine and the Law

## Care and Medical Care

A WOMAN patient, aged 62, visited a doctor for a course of treatment for her neck and right arm. On about the sixth visit, when the patient was still suffering from considerable pain, the doctor, after giving electrical treatment, asked her to lie on a couch in a cubicle for manipulative treatment to her neck. The treatment necessitated her lying flat on her back with the doctor standing at her head. On the couch, which was covered with 'Rexine,' there was a blanket which was not tied with tapes but was to some extent kept in position on the right side by a flange along the side of the cubicle against which it was pressed; the top of the couch was 2 ft. $9\frac{1}{2}$ in. from the floor and it was impossible for the patient to reach the floor when in a sitting position. When the treatment was finished the doctor indicated that the patient should get off the couch and she had reached a sitting position and was swinging her legs round to the left when the blanket came away and the patient and blanket fell to the floor. As a result the patient sustained a fractured wrist. She sued the doctor for damages alleging negligence.

Mr. Justice ASHWORTH said that it was clear that where there was a displaced or loose blanket on rexine, a person on top of it who moved their legs round on it, was likely to slip. That was not to say that from a legal point of view his Lordship condemned the use of blankets on rexine couches, but the weight of evidence seemed to be that it should have been wedged against a wall or tied with tapes. It did not follow from the event that the doctor was guilty of any breach of duty. A duty of care was individual and had to be considered in the light of the circumstances in the consulting-room. The doctor was dealing with a lady aged 62, who was not well and whose right arm was giving her trouble; he had said that owing to her condition the possibility of her falling off the couch was a real possibility and that he had it in mind. If one accepted that answer then the doctor should have known that a patient of that age and in that condition required assistance in getting off the couch. The doctor in the exercise of reasonable care should have placed himself at the side of the couch to help her. There was ample opportunity for him to have got round to the side of the couch, and if he had been there he would have prevented the accident. His Lordship added that the case did not reflect on the doctor's duty of care as a doctor. His Lordship awarded the patient £250 damages.

Wilson *v.* Tomlinson.—*Queen's Bench Division:* Ashworth J. Nov. 21, 1956. A. S. Orr (Ellis Bickersteth & Co.); J. R. Cumming-Bruce (Hempsons).

C. J. ELLIS
Barrister-at-Law.

# In England Now

*A Running Commentary by Peripatetic Correspondents*

TILL last month I was inclined to agree with the American who maintained that God had given him two legs solely that one could be used for the accelerator and one for the brake. Now with petrol-rationing looming ahead I'm inclined to differ. After all legs did come before cars and it's quite a pleasant experience to stretch them occasionally. At first, the idea being new and muscles being stiff, it was slow going, but last week I actually walked the half-mile to the post-office and back and enjoyed it. Later I even visited a few patients on foot. Becoming more venturesome I dreamed of selling the car, thereby saving vast sums yearly, and incidently losing a couple of stone into the bargain. Equipped with stout shoes and a raincoat, my pockets bulging with pads of E.C.10, and handfuls of tranquillisers, I'd weather the storm. But dreams don't last. Winter is coming, snow will soon fall, and some of my patients need more than tranquillisers. I fell from grace. Yesterday I queued for my basic. I filled in my buff form. Tomorrow the R.P.O. will be notified that extra petrol is essential for my work. And once again my leg muscles will begin to atrophy.

* * *

Words, words, words, like the multitudinous swish of the tideless Mediterranean waves. No wonder they have stomatologists and "acousticiens" in the Bouillabaisse city. It would be surprising if there were not laryngologists busy with the chronic laryngitides; but I expect they are here too, in the rue Rouget de Lisle, their brass plates hiding behind the barrows of sea-urchins and oysters (specialisation is needed here also, for you cannot just ask for "huitres," you must designate Côtes bleues, Portugaises, Arcachons, Vertes de Claires, Marennes).

Unspoken thoughts die in utero, but in this city vitality is the hallmark of the leading personality. In the company of the eloquent, and against the flood of the Bouches du Rhône and the force of the Mistral, an effect may be achieved by speaking ve-ry slow-ly and de-li-ber-ate-ly. And so the Englishman rises to his feet, slowly and not impetuously, and the company falls into silence as he announces that he intends to speak the Queen's English. The eloquent do not answer back, because they cannot follow a thought which takes so long to see the light of verbal day. Then the oil of Portugal, the mellifluous soothing tongue of Portugal, comes to smooth the waters of Marseilles. The solid Swiss, the wary Hungarian, and the sober Dutch who yet breaks into boyish laughter when he does see the point, all usefully buffer the trains of thought. Reciprocal antagonism between conditioned reflexes is brought into the light of day, depolarisation of dendrites is discussed in relation to hippocampal discharges, onirism is defined as a multisensorial hallucinatory state, there are flashed on the screen electroencephalographic rhythms from the depth of the brain, recorded with electrodes 37·5 microns in diameter (now I believe reduced to 20 microns). But the distinguished Norwegian Epileptologist (his nomenclature, not mine, I would disown such a foundling) went home determined that his children should learn French. It was really too ignominious to be invited to speak at the *Colloque de Marseille* and to be surrounded by a cluster of jackdaws who got the last word by sheer orchestration of verbalisation.

* * *

I should like to draw attention to a well-defined syndrome which, though common has, as far as I know, not yet been described. I have provisionally named it tinnitus telephonus, the telephone-bell syndrome. In its acute form it seems to be most prevalent among housemen, particularly the newly qualified. The full clinical picture is best observed in nocturnal cases.

The patient generally wakes at about 3 A.M. What at first is thought to be a dream suddenly becomes a reality. He sits up smartly in bed with the telephone bell ringing in his ears. The resultant hypotension is accompanied by an alarming tachycardia and precordial palpitations. An acute dyspnœa has been observed in several cases together with marked pallor, simulating air-hunger. An acute feeling of anxiety arises, often amounting to a sense of fear. Wild distressing thoughts flash across the mind and a feeling of helplessness ensues. The patient dresses hastily with a trembling agitation. Sometimes he arrives at the wards with his eyes still closed and his shoes on the wrong feet.

Ward sisters have attempted to alleviate tinnitus telephonus by administering tea or coffee. This generally helps to restore the patient sufficiently to carry out simple reflex mental processes. But invariably, on his return to bed, he lies awake for an hour or more disturbed by an incessant stream of thoughts and a persistent tachycardia believed to be caffeine-induced. A dread of the telephone bell lurks in his subconscious mind and prevents his relaxation. He wakes late the next morning with a powerful frontal headache which does not yield readily to analgesics.

* * *

Working with the fungus *M. moribundus*, or Embalmers Blight, which festoons most of the in-trays at the Ministry of Incoördination, Prof. T. Cobbleigh and his colleagues at the Widdicombe Research Centre have isolated yet another wonder drug, 3-blindmycin, which is cheap and nasty and the only antibiotic as yet which can also be used as a culture medium. How this and other timely economies have been achieved at Widdicombe is revealed today in a pamphlet on Practical Economies in the N.H.S.; or, Your Hospital and How to Sue It (*Widdicombe klinische übertriebene Sparsamkeit.* H.M.O.S. 3*d.*).

The centre cuts expenses by such devices as a complete replacement-transfusion from the Blood Bank for each patient on admission, thus rendering any further hæmatological investigations unnecessary. Drug costs are slashed by using gob-stopper therapy: each of the component layers of the 2-in. diameter gob-stoppers incorporates a different medicament and is distinctively coloured. As each layer is sucked off, the gob-stopper is dipped in phenol and transferred to the next patient. In the Davey Crockett ward, where there are no nurses, the transfer is effected by blow-pipes.

Domiciliary practice will welcome the Widdicombe workers' suggestion that any patient seeing his doctor less than three times a year should be awarded a badge entitling him to be seen first at any doctor's surgery; and that anybody who has not consulted a doctor for six months should be forcibly examined to see what is wrong with him. The team await the Chancellor's comments on their suggestion that doctors' income-tax should be regarded as an allowable expense against income-tax.

* * *

My air journey from Italy to London was ruined by an International Pest. She came on board, if not in my immediate company, at least somewhere near me in the procession of passengers, and settled down beside a young lady in the seat before me, but not for long. Before we rose from the runway she had pestered the young lady almost out of her wits, and I was next to receive attention. Neither an assumption of indifference nor frank hostility had the intended effect. In the end I would gladly have slaughtered her, if I could; and I now confess that I made a pass at that. But she was quite wary of unfriendliness.

My learned neighbour called her *M. domestica*, which I corrected to *Mme. indomestica*, for I have seldom seen anyone better able to fend for herself in any environment. In the end she flew away busily to pursue some affairs of her own in the London air.

* * *

The little man who appeared in the casualty department was not remarkable, but his loyalty to his family doctor was.

"Yes? What are you complaining of?"

"I think it's indigestion, doctor."

"We don't treat indigestion here, you must see your own doctor."

"I can't."

"Why not?"

"He's dead."

"Well, why don't you go to another one?"

"Oh no, I couldn't do that. He was a very good doctor, was mine. Very good to me, he was. I wouldn't want to change him!"

# Letters to the Editor

## ADVERTISEMENTS FOR DRUGS

SIR,—At present the ethical pharmaceutical industry is under fire from a small but vociferous number of doctors who criticise the method and manner of advertising, the visits of representatives, and the "insidious" publication of the "inspired" article. No reasonable man shrinks from fair criticism, and in this instance most pharmaceutical manufacturers will welcome it, for they are eager to improve methods of informing the profession about their products, and to eliminate waste in doing this. But it is to be regretted that some at least of the critics of pharmaceutical promotion seem perhaps to have allowed a political prejudice against all private enterprise to tinge their opinion. If this suggestion is unjustified, it is difficult to see how they can disregard the fact that the greater part of modern therapeutic advance has been made in the laboratories of commercial houses, and by "outside" academic and "outside" clinical workers supported by the pharmaceutical companies. Further, all the major firms have not only one or more full-time medical men on their staff, but retain as advisers a large number of professors and consultants among whom are many of the leading members of our profession—one in which integrity has always been prized as a prime virtue.

These attacks are also directed, by implication at least, towards all medical brethren who pay any attention to the commercial promotion of new drugs, who use their knowledge and experience to separate the wheat from the chaff, before prescribing such remedies even though these have not yet qualified for the *British Pharmacopœia*. Drugs are not included in this and other standard volumes until an extensive experience has been gained in their use, and such experience could hardly be obtained without clinical and laboratory work. It may well be asked how this is to be done without coöperation between the manufacturer and the medical profession.

No-one would deny that some of the therapeutic novelties have little to recommend them, and that some advertising outruns the licence normally accorded to this inescapable necessity of modern times—even nationalised industries advertise. But when a large and progressive industry, which has made a specially valuable contribution to export, is condemned because its tail end drags in the dust one may point out that it is a common fallacy of inductive reasoning to apply without evidence to the whole what is true of only a small part.

So much of this is so familiar to the great majority of your readers that I feel some apology is due for taking so much of your valuable space. I have sought the hospitality of your columns not so much because medical men need to have these facts pointed out to them, but because such adverse criticism has been applied by the lay press and in political circles not only to blacken the industry, but, both by implication and directly, to attack the medical profession as a whole.

The Distillers Co. (Biochemicals) Ltd., London, W.1. W. P. KENNEDY Chief Medical Adviser.

SIR,—An unusual and dangerous method of advertising has come to my notice.

Everyone is familiar with the street canvasser of coupons for soap flakes, &c. Recently such a person passed from door to door up the road where I live giving away free samples of aspirin tablets. In our own case the doorbell was rung but before the door could be answered the samples were being pushed through the letter-box. Conversation with the canvasser showed that each family was to receive six gr. 5 aspirin tablets. Their only covering was a little tinfoil which any child could undo in a moment. They were accompanied by a pamphlet suggesting that the tablets would relieve colds, influenza, and insomnia in addition to pain due to various causes.

One is disturbed at the lengths to which this method of advertisement for drugs might be carried. Correspondence with the firm elicited a somewhat unsatisfactory reply and showed that they were unconcerned with the ethics of handing out drugs free as an advertisement. In fact at first they were put out at the unfairness of there being no plate on my door to warn the canvasser!

London, W.5. N. F. COGHILL.

## HYPOTHYROIDISM AFTER THYROIDECTOMY

SIR,—May I elaborate, somewhat belatedly, the letter of Dr. Deborah Doniach in your issue of Sept. 1? In this letter she pointed out that in Dr. Baron's series half the cases of postoperative hypothyroidism (excluding that intentionally induced) occurred in patients with Hashimoto's disease. She added that in a survey at the Middlesex Hospital 30 out of 31 patients with Hashimoto's disease became hypothyroid after operation, whereas hypothyroidism is "relatively uncommon" after operation for other types of goitre.

Of course, the incidence of hypothyroidism must depend to a certain extent upon the surgeon's habit. It has been shown that a surgeon who increases the amount of gland he habitually removes increases the proportion of patients developing postoperative hypothyroidism and decreases the recurrence-rate. But the change in the figures is not likely to be great, presumably because any healthy thyroid tissue left behind is stimulated to hypertrophy by the anterior pituitary. In Hashimoto's disease this does not occur—a fact which is well recognised. What is less well recognised is the high incidence of hypothyroidism after the removal of thyroids containing lesser amounts of lymphadenoid tissue. In a survey at New End Hospital[1,2] it was found that, whereas 100% of patients with Hashimoto's disease developed hypothyroidism, this result followed also in 83% of patients with severe lymphadenoid changes short of Hashimoto's disease, 38% of patients with mild lymphadenoid changes, and only 0·3% of patients in whom no lymphadenoid change seemed to have occurred.

London, W.1. RAYMOND GREENE.

## ERADICATION OF TUBERCULOSIS

SIR,—Dr. Pugh and Dr. Jeanes, on behalf of the South-East Metropolitan Regional Tuberculosis Society, present (Nov. 17) a number of interesting methods for the attack on tuberculosis, all of which should be executed in the next two years. However, unless greater emphasis is laid on the preventive aspect, and greater dynamic put into the whole drive against this disease, not only will the public continue to accept it as one of the scourges of civilisation but the chest services will be long occupied in dealing with a preventable disease instead of making further strides in the attack on the other two major problems—chronic bronchitis and carcinoma. If the propaganda that has been directed to vaccination against poliomyelitis, a disease with an incidence and a killing power much below that of tuberculosis, had been used for B.C.G. vaccination and to stress the advantages of treatment and the fact that the disease is curable and preventable, a great step forward would have been made. There is a considerable danger that the publicity attaching to poliomyelitis may force the problems of tuberculosis out of the public's attention and also from the attention of the medical profession.

There should be a shift of emphasis in the mass X-ray drive to make full use of all the voluntary services of a community.

1. Greene, R. *J. Endocrin.* 1950, **7**, 1.
2. Greene, R. *In* Memoirs of the Society for Endocrinology. London, 1953; vol. 1, p. 16.

The units must visit workers not at work but in their homes, in their hostels, and in reception centres. Now there are empty beds in sanatoria throughout the country the advantages of treatment must be stressed. Mass X-ray directors should be able to inform works medical officers of new cases. At present a person found by a mass X-ray unit to have disease may continue to work simply because he has refused to go to a chest clinic or even to his general practitioner. One does not allow a case of smallpox that is known to the medical profession to go on working simply because the doctor at the place of work has not made the diagnosis. The problem of disease among vagrants should be tackled much more vigorously, and I would suggest that there should be a given day when all vagrants throughout the country should be persuaded to have an X-ray. In this way some idea of the problem could be obtained. Preliminary work on this subject suggests that there are probably about 1500 men who wander up and down the country distributing their disease. Of course many are somewhat psychopathic, but so far in this country we have been spared the trials of "Skid Row." More emphasis should be placed on the value of a negative chest X-ray, and all those who come in contact with children, or food-handlers, should be persuaded of the advantages of annual mass X-rays. This is particularly true of teachers.

All the branches of the medical services will have to combine to overcome administrative inertia and public apathy in order to deal with this urgent problem as quickly as possible. Diphtheria is a relatively rare disease; tuberculosis can and must be placed in the same category.

Camberwell Chest Clinic,
London, S.E.5. KENNETH MARSH.

## FUNCTIONS OF THE MENTAL HOSPITAL

SIR,—In his excellent survey (Nov. 17) Dr. Clark omitted to draw attention to a completely new function—hospitality for the common drunk. This applies with peculiar force to the open-door hospital.

The routine is that the drunk arrives well after closing-time, and says he feels terrible and can he come into hospital—"my nerves are bad" or some such magic spell being repeated, while he lurches about the entrance hall and becomes aggressive and even more unpleasant when told he cannot be admitted. Eventually the police are summoned and escort the unwanted guest from the premises—only to bring him back an hour later under Section 20 of the Mental Treatment Act. Next day the man has recovered and two days later, when his three-day observation has expired, he goes out.

This has happened in my own experience four times in the past six weeks. The social implications are enormous. In all seriousness I suggest the day is not far distant when we shall require to put the iron gates back on again—to keep unsuitable applicants out.

St. Nicholas Hospital,
Newcastle upon Tyne. R. S. FERGUSON.

## PENSIONS FOR DOCTORS' WIDOWS

SIR,—I feel that many practitioners may be unaware of the pension position of their wives when they die.

The important fact to be remembered is that no pension is payable to a widow unless her husband has served ten years in the National Health Service. Every practitioner who entered the service on the appointed day (July 5, 1948) still has eighteen months to go before his wife would be entitled to a pension, should he have the misfortune to die.

I have found out that if I die between now and July 5, 1958, my wife would receive no pension at all; but if I died on July 6, 1958, she would receive approximately £270 per annum for life or until she remarried. The discrepancy is very pronounced. A widow's pension is one-third of her husband's pension, but it is rated up so that it cannot be less than a third of the pension the doctor would have received had he served for twenty years.

To neutralise the discrepancy I have insured my life from the present time until July 5, 1958, for £5500 (this sum invested at 5% would produce £275 per annum) for one premium of £75, and there is some income-tax relief. Lloyds quote 27*s.* 6*d.* per £100, but tariff companies quote a higher figure. Obviously the amount varies with the age of the applicant and the sum required to produce on investment a figure equivalent to the estimated pension.

Perhaps most practitioners are more cognisant with the position than I was until I made inquiries; but this information may be of help to some.

Burnham, Bucks. H. M. JAQUES.

## TRIAZOL IN SCHIZOPHRENIA

SIR,—I was particularly interested in Dr. Pakenham-Walsh's account (Nov. 17) of his experience with "triazol," as I was using it extensively in two large mental hospitals before the advent of electroconvulsive therapy (E.C.T.) and deep insulin. I have continued to employ this method of shock therapy ever since, in combination with E.C.T. and insulin coma, in selected cases.

It is now considered unjustifiable to use E.C.T. without the administration of thiopentone and suxamethonium relaxation technique, but in spite of this I am still in favour of triazol in certain cases. My technique would appear to differ from that described by Dr. Pakenham-Walsh as I favour the intramuscular rather than the intravenous approach. My reason for this is that I am able to employ psychotherapy during the usual fifteen or twenty minutes elapsing between the injection and the convulsion. During this period the patient appears to regress to an infantile state of mind; he will throw his limbs about and cry and talk like a young child. In a great number of cases during the late war I was able to employ psychotherapy with advantage owing to easily induced transference. The traumatic effect of E.C.T. has been considerably diminished since relaxation methods became general, but in my experience the traumatic effects are less when triazol is used than are those experienced in straight E.C.T., and the good results from the combined psychotherapy more than compensate for this trauma. I am glad to support Dr. Pakenham-Walsh's plea for its use in schizophrenia.

Northumberland House,
London, N.3. ROBERT M. RIGGALL.

## DENTISTRY

SIR,—The letter of Mr. Bowdler Henry (Oct. 27) prompts me to point out some errors in Appendix VIII (p. 60) of the report of the Committee on Recruitment to the Dental Profession.

The first English book on Dentistry was *The Operator For the Teeth* (Charles Allen, York, 1685). *Curious Observations In that difficult part of Chirurgery Relating to the Teeth* was the title of the third edition of 1687. The correct title of Hunter's book of 1771 is *The Natural History of the Human Teeth*. I can find no evidence that Joseph Fox (1775–1816) ever held the Royal Appointment, although he was "Surgeon Dentist Extraordinary to their Royal Highnesses the Dukes of Kent and Sussex."

It is indeed difficult to avoid errors in historical matters, but it is unfortunate that this authoritative report should be inaccurate in even the smallest matters.

With regard to Mr. Bowdler Henry's letter, it is stated on p. 139 of Hill's *History of the Reform Movement in the Dental Profession* (1877) that the Dental Hospital of London was opened on Nov. 1, 1858, and on p. 175 that the London School of Dental Surgery was inaugurated on April 30, 1860: which dates do not agree with those given by Mr. Bowdler Henry. It is possible that Mr. Bowdler Henry's researches have shown that the dates given by Hill are inaccurate, but it appears to me that, while the Dental Hospital of London is the oldest dental hospital now in London, the National Dental Hospital can claim the oldest dental school, since it arose from the Metropolitan School of Dental Science founded on Oct. 5, 1859. It is, however, probably true, as Mr. Bowdler Henry observes, that the first dental *school* with a regular curriculum, and full facilities for clinical instruction was the London School of Dental Surgery, since the Metropolitan

School of Dental Science was not associated with a dental hospital until 1861.

Finally, Sir, the oldest dental hospital in this country, and possibly (dare I say ?) in the world, is the Birmingham Dental Hospital, which celebrates its centenary in January, 1958; and although I agree with my friend Mr. Bowdler Henry that it was at first a small dispensary, it was properly organised, with the mayor of the town as president, a committee, and the usual officers.

Warwick. R. A. COHEN.

## OPERATING-THEATRE STERILISERS

SIR,—Where central sterile supply departments have not yet been instituted, the following sterilisers are essential in all surgical suites: (1) dressing sterilisers for porous or packaged equipment; (2) hot-air ovens for cleaving or lubricated instruments, 'Vaseline' gauze, powders, oils, &c.; (3) bulk water/saline autoclaves for basin fluids; (4) instrument-washer sterilisers or, where instruments are to be hand-scrubbed, rapid high-pressure instrument/bowl autoclaves. Where comprehensive central supply has been effectively instituted, the only theatre steriliser required is an instrument-washer steriliser or alternatively a dressing steriliser with a special rapid high-pressure additional steam circuit for bowls and instruments. In certain theatres a hot-air oven is also essential—e.g., eyes. Mr. Barrington Brock (Oct. 13 and Nov. 24) is therefore justified in his contention that operating-theatre sterilisers include hot-air ovens.

I would like to congratulate you on your leading article of Nov. 10 which emphasises the need for providing our theatres with either central supply or the essential range of sterilisers each so designed as to be capable of effecting sterilisation.

Department of Bacteriology, Royal Infirmary, Edinburgh. J. H. BOWIE.

## ENCEPHALITIS, MENINGITIS, OR POLIOMYELITIS

SIR,—

"A Rose by any other Name would Smell as Sweet."

It was inevitable, I suppose, that the absence of a single recognisable case of encephalitis from the series I described as encephalitic (Nov. 17) should cause some comment in your annotation last week. My aim was to announce the existence of an unusual epidemic disease in a community, but not to describe it in all its manifestations. Incomplete reports tend to mislead, but at this point some evidence of encephalitis seems to be called for.

The rash, the lymphadenopathy, the faucial and conjunctival injection, the presence in the blood of numbers of abnormal lymphocytes, the occasional albuminuria, the hepatitis (jaundice rare but abnormal liver-function tests not uncommon), the muscle pain and tenderness indicate that the Newton epidemic is of a general disease, and the subjective and objective sensory disturbances, reflex changes, and weakness that the nervous system is involved. That this neurological injury is sometimes encephalitic cannot be denied, for by McAlpine's [1] criteria (nystagmus, photophobia, and neck stiffness after fever and headache) there have been five such cases, and the appearance of various patterns of pyramidal-tract, ocular, and psychological disturbance suggests the diagnosis in several more.

One cannot yet produce a definitive, or even useful, account of this disease because there is still a good deal of material to be collected and sorted out; but an analysis of the first 125 cases of all ages shows that, among other signs and symptoms, 102 had headache, 24 had marked neck stiffness, 19 had photophobia, 6 adults had violent vomiting unaccompanied by nausea, 18 other adults and 32 children vomited more than twice, 32 were drowsy, 21 described various "queer feelings" in the head, 16 had attacks of dizziness (usually without sensations of rotation), 9 had nystagmus, 9 had blurring of vision or difficulty in focussing, 5 had Babinski responses, 8 had very brisk tendon jerks (sometimes unilateral), and 22 became very irritable and 9 depressed in convalescence. In a few the electro-encephalogram was abnormal, but the significance of the changes is doubtful. Acute muscle pain and tenderness were found in 48, of whom 34 were adults, and usually dominated the clinical picture. Gross papilloedema was not seen, but some blurring of the disc margin was by no means rare.

It will be seen that the people with clinical evidence of dysfunction of the central nervous system are in a minority; but it is this minority which causes the physician most anxiety, which is likely to lead to admission to hospital and which, I think, justifies the use of the word encephalitis in the title of the disease.

Happily, there have been no deaths and no parkinsonian sequelæ. The classical types of acute illness described by von Economo [2] have not once been observed here, and the fleeting neurological signs which have so often been seen make the diagnosis of poliomyelitis an unlikely one.[3] Apropos poliomyelitis, one case has been diagnosed here this year and type-1 virus was isolated from the stool.

Newton-le-Willows, Lancashire. W. H. LYLE.

1. McAlpine, D. *Proc. R. Soc. Med.* 1947, **40**, 929.

## HYPOTENSIVE EPISODES FOLLOWING TREATMENT WITH MEPROBAMATE

SIR,—Meprobamate ('Equanil,' 'Miltown') is in common use as a tranquilliser in states of anxiety and tension. We wish to report hypotensive episodes in three patients receiving the drug.

CASE 1.—A woman, aged 63, had been admitted with severe depression probably induced by reserpine given for the treatment of hypertension. The reserpine had been withdrawn fourteen days before meprobamate was given. Her blood-pressure (B.P.) was 190/110 mm. Hg. After two days of meprobamate 800 mg. b.d., she complained of drowsiness. Her B.P. was found to be 120/80. Physical examination showed no changes which might have accounted for the fall in B.P. The B.P. rose to the previous level after meprobamate was withdrawn.

CASE 2.—The second patient was a woman, aged 57, with an obsessional tension state and B.P. 180/100. With bed rest and sedation her B.P. fell to 160/90. The barbiturate was replaced by meprobamate 800 mg. t.d.s., and two days later she said she felt very dizzy and weak and looked pale and ill; her B.P. was 90/50. There were no other abnormal physical signs. The dose of meprobamate was reduced to 400 mg. b.d., and her B.P. rose to 135/90 within twenty-four hours.

CASE 3.—The third patient, a man aged 60, had a severe involutional depression; his B.P. was 145/85. He was given meprobamate 400 mg. q.i.d. for twenty-four hours and then 800 mg. t.d.s. for a further twenty-four hours. Subsequently he was found lying motionless in bed, pale and cold to the touch; his B.P. was 90/50, and physical examination revealed no other abnormality. Meprobamate was stopped; but, even after 15 mg. of methylamphetamine hydrochloride intramuscularly, the B.P. did not rise to a level of 140/80 for nearly twenty-four hours. A week later the patient was (with his consent) given meprobamate 800 mg. and his B.P. was recorded hourly. After four hours it had fallen from 135/85 to 115/80. A further 800 mg. of meprobamate was given, and within two hours his B.P. fell to 90/50; again he became pale, cold, inert, and less responsive, but his condition improved gradually over the next twenty-four hours. Three days later his mean B.P. was 115/85.

None of these patients showed significant changes in pulse-rate or temperature. Respiration was normal in rate but shallow. Sweating was not increased.

It is not clear what these three patients had in common that they should react so alarmingly to a drug given to many other patients with no ill effects. All were elderly, two had psychotic depression, and two had raised blood-pressure. Berger [4] states that meprobamate acts on the

2. von Economo. Encephalitis Lethargica: its Sequelæ and Treatment. London, 1931.
3. Toomey, J. A. *J. Amer. med. Ass.* 1941, **117**, 269.
4. Berger, F. M. *Int. Rec. Med.* 1956, **169**, 184.

central nervous system only, without affecting autonomic functions. He cites drowsiness and infrequent allergic reactions as the only side-effects. He also remarks that the drug can be safely administered to hypertensives because it does not affect the blood-pressure.

This side-effect does not seem to have been previously reported, but Shane and Hirsch [5] have described three cases in which coma and a dangerous fall in blood-pressure followed suicidal attempts with large doses of meprobamate. L. Selling (cited by Berger [6]) has found that "an allergic reaction," when present, usually occurs after only one to four doses of meprobamate: he numbers "fainting spells" among the more severe manifestations of such a reaction, but considers them infrequent.

Further observations on the effects of meprobamate are being made in this department. Meanwhile, we suggest that care should be taken in prescribing this drug for elderly or hypertensive patients.

P. A. L. SCOTT
LINTON GRIMSHAW
H. M. P. MOLONY.

University Department of Psychiatry, Manchester Royal Infirmary.

## MEGIMIDE IN ACUTE PORPHYRIA

SIR,—While reading the papers on 'Megimide' in the treatment of barbiturate poisoning in your issue of Nov. 10 the thought struck me that this or other substances with antibarbiturate action may have a beneficial effect on attacks of acute porphyria. These attacks are known to be provoked by barbiturates; and it does not seem unreasonable to believe that barbiturate antagonists may cause the enzyme systems which are disordered in acute porphyria to function normally, since barbiturates can derange the normal function of these enzyme systems in cases of latent porphyria. As acute porphyria is a serious and often fatal disease for which we have no reliable therapy, all possible methods have to be tested. I therefore recommend that megimide be tried—primarily in cases known to be provoked by barbiturates, but also in other cases of acute porphyria.

Svendborg County Hospital, Denmark. TORBEN K. WITH.

## TERRA SIGILLATA

SIR,—As a student of geophagy [6] I am grateful to Dr. D. A. K. Black for his article (Oct. 27) on this subject.

It is true that some resins have very high cation-exchange capacities, but their rate of exchange is slow unless they are very finely ground. If the cation is very large (e.g., in strychnine) these resins are relatively ineffective because the ions cannot diffuse into the pores of the resin; zeolites and inorganic water-softening compounds behave similarly.

Some of the clay minerals disperse in water to a particle size much smaller than can be obtained by grinding resins or zeolites. To continue Dr. Black's example of 6 g. = 44 m.eq. of mercuric chloride, we see that 0·5–0·65 g. of bentonite or fuller's earth, the essential clay mineral of which is montmorillonite, would be necessary to provide the exchange equivalent.

At least 10 g. of kaolin on the other hand would be needed to provide exchange sites for the mercury. Fuller's earth is commonly kept in the home and could be provided in first-aid kits. If it is not readily available, the following course of action might be recommended: go to the garden, dig up 100 g. of earth from say 10–20 cm. down, stir into 100 ml. of water with 0·2 g. of sodium carbonate (a little more of washing-soda), allow sand to settle. The clay minerals in suspension will have cation-exchange properties; the dosage required in the present example would probably be 2–4 g. of the dry clay.

The Ancients had much better clays for the adsorption of cationic poisons than Lemnian earth, but none apparently questioned the restrictive practices which attended its quarrying, manufacture, and sale. There is, however, nothing to stop us from using montmorillonite whenever it is needed, or mixed soil-clay minerals in times of emergency.

Glasgow, W.2. ROBERT H. S. ROBERTSON.

## DANGEROUS CONTAMINANTS IN STORED BLOOD

SIR,—Dr. McEntegart's paper (Nov. 3) is a useful warning of a not unsuspected danger which is, I understand, being eliminated. Unfortunately Dr. Aidin (Nov. 17) offers bad advice in condemning pilot bottles and advocating examination of a stained film from every bottle. In his hands this may be satisfactory, but the average resident in clinical pathology will confuse non-bacterial débris with bacteria and go on entering bottle after bottle so that the last state of the bank will be worse than the first—and (as Dr. McEntegart remarks) quite unnecessarily if the blood is less than two weeks old.

In Britain, dangerous bacterial contamination of blood is rare and usually occurs when the bottle has been entered and then allowed to stand several hours at room-temperature. If such carelessness is avoided the frequency is very low—in the North London area less than 1 in half a million. Epidemics of infected blood have occurred, but these have been due to the faulty use of badly designed autoclaves and have ceased since Spooner published his investigations [1] and his advice has been meticulously followed.

These accidents are common in some other countries, and were discussed at the Austrian Blood Transfusion Conference of 1954.

Spielmann, of Frankfurt-am-Main, had had no trouble in 10,000 bottles; but Vonkilch, of Vienna, started with a 15% incidence of contaminated bottles, and gradually reduced this to zero by improving her standards of sterilising and sampling and by laying dust in the collecting-room. A. J. Stevens, jun., of Seattle, said: "From only six or eight cities we collected over twenty recent and serious reactions from contaminated blood. . . . In one blood bank I learned of seven serious reactions from contaminated blood in the preceding year, four of them fatal."

This picture is quite different from ours. In part it may be due to the use of vacuum bottles which inspire dust as well as blood, but it is more likely to be due to failure to adopt the rigid standards of sterilisation laid down by Spooner. Britain is small, densely populated, and served by a single transfusion service. America is huge, sparsely populated, and served by many separate organisations. Individual variations are common. For example, in one great hospital I saw blood for transfusion being filtered through an open funnel to remove clots, exposed to the dust of the department through which a stream of visitors was passing; and small communities may have to depend on a blood bank run by a registered nurse with only nominal supervision. The 1 in 2000 death-rate cited by Dr. Zeitlin comes from American sources and is not surprising when these varied conditions are taken into account. In Britain the death-rate is much less—from infected blood very much less.

Surely the wiser plan is to go on improving sterilisation and asepsis, to maintain refrigeration until just before use, and to avoid entering the bottle *by making use of pilot-tubes universal*—for a bottle which has been entered has a shelf life of only a day or so. What a pity we cannot always use blood less than two weeks old.

Central Middlesex Hospital, London, N.W.10. GEORGE DISCOMBE.

SIR,—Dr. Aidin revives an old controversy—namely, whether blood bottles should be opened for bacteriological examination and cross-matching before issue. He recommends this practice.

5. Shane, A. M., Hirsch, S. *Canad. med. Ass. J.* 1956, **74**, 908.
6. Robertson, R. H. S. *Discovery*, 1947, **8**, 213; see *Lancet*, 1947, ii, 742.

1. Spooner, E. T. C., Turnbull, L. H. *Bull. War Med.* 1942, **2**, 345.

As a newcomer shortly after the accidents referred to in Dr. McEntegart's article, I had the opportunity of studying the effect of this practice on a transfusion laboratory cross-matching upwards of 120 bottles per week. Adopted immediately after contaminated bottles had been discovered, it was continued for some weeks until the strain on resources both of staff and of material led to its abandonment. The main difficulties were these :

1. A bottle opened for sampling had to be used or discarded within a few hours, the process of sampling itself being potentially dangerous. Pilot tubes were used for cross-matching and the bottles opened only for the preparation of a stained film immediately before issue. As it was, the wastage-rate was extremely high, especially in the issues to outlying hospitals. But if (as I infer Dr. Aidin recommends) pilot tubes had not been used at all, cross-matching as well as the bacteriological examination could have been done only at the last moment before any planned operation.

2. In cases of emergency the time spent on making and examining the smear correspondingly lessened that available for the cross-matching tests. It seemed that one hazard was being substituted for another.

3. The strain on staff was another important factor. The night work was heavier, involving a technician sleeping in rather than being on call ; for, apart from the usual emergencies, bottles that had been cross-matched during the day had to be opened for sampling if needed during the night.

Surely the answer to this problem lies rather in prevention, with strict attention to methods of sterilisation, blood collection and storage, with full bacteriological controls where appropriate.

Pilot tubes are of course a compromise, but recent experience has supported the view that they are a successful one and that their use is preferable to a cumbersome alternative which may even reintroduce the hazard it is designed to prevent.

Aberdeen and North-east of Scotland
Blood Transfusion Service,
Royal Infirmary, Aberdeen. J. S. CAMPBELL.

## ADVERTISING CONSULTANT POSTS

SIR,—Dr. Calnan (Nov. 17) does the registrars a kindness in pointing out the unnecessarily short interval so commonly allowed between the advertising of consultant posts and the closing date for applications.

I recently submitted an application, two weeks late, for an appointment that had been advertised while I was abroad. I called at the office of the regional hospital board to explain the reason for my delay, and was most courteously told that they would do all they could to get the application put through. The day before the interviews I was informed that, for bureaucratic reasons which I do not understand, my application had not been accepted. Such is the inflexibility and power of the administrators who control our futures.

London, W.1. P. A. J. SMITH.

## HEAT-STROKE DURING AND AFTER ANÆSTHESIA

SIR,—I was interested in the article by Dr. Harris and Dr. Hutton (Nov. 17). Some time ago I suggested that it was advisable to cool the inspired gases in enclosed anæsthesia, to prevent a rise in body-temperature.[1] The high humidity and temperature of the inspired gases, added to the heat and moisture caused by the circulation of carbon dioxide through soda-lime, causes a further increase in temperature. It is now possible by cooling the inspired air, by means of refrigerant fluids, to control body-temperature when man is exposed to high temperatures at 100% humidity.[2] The problem of preventing heat-stroke during anæsthesia in environmental temperatures of 70°F at 74% relative humidity should thus be an easy matter if refrigerant fluids were used to cool the inspired gas.

Tunbridge Wells. E. F. St. JOHN LYBURN.

1. *Lancet*, 1954, i, 731.
2. Lyburn, E. F. St. J. *J. Physiol.* 1956, **134**, 207.

## ENDOBRONCHIAL TUBERCULOSIS IN CHILDREN

SIR,—I read the important communication from Dr. Seal and Mr. Thomas (Nov. 10) with the greatest interest, particularly as my colleagues and I [1] had referred to this unusual and original work at an earlier stage. At that time we said : " Whilst there is room for difference of opinion on the place of thoracic surgery in primary tuberculosis, all will agree that specimens obtained in this way merit the closest attention." Now we learn that thoracotomy has been undertaken in over 150 children. Your correspondents' letter can only whet our appetite for the full documentation that we trust will be available soon.

In the past ten years, 2880 children suffering from pulmonary tuberculosis have been treated at High Wood. Of this number, 580 (20%) were classified as chronic pulmonary tuberculosis, and, amongst these, major surgical procedures had an important place. But for the rest thoracotomy has very seldom been undertaken. So far this year only 3 (4%) underwent a major surgical operation out of the 71 discharged in our simple primary tuberculosis or segmental groups, compared with 9 children (19%) out of 51 amongst the cases of chronic pulmonary tuberculosis.

Though the incidence of tuberculosis in South Wales may be greater than in the area served by my hospital, the individual cases do not differ in character. It would be possible to match Thomas's material case by case from High Wood children treated conservatively.

In your annotation (Oct. 13) you say : " Surgical removal of caseous nodes which are the cause of pressure phenomena and which cannot be dealt with through the bronchoscope seems attractive therefore both for its immediate benefits and as a means of avoiding later recrudescence." Ought we not perhaps to think again before advocating so major an undertaking in so many children who undergo primary infection ? Cases with glands " causing pressure phenomena which cannot be dealt with through the bronchoscope " are common. What you are advocating is in effect opening the chest of possibly 5–10% of all tuberculous children. This would seem excessive rather than " attractive."

It may be that operation should be undertaken more frequently. Yet even in the pre-antibiotic era our segmental lesions (so called epituberculosis) fared well, and we were able to report that whilst in this group 27 of the 169 patients suffered one or more tuberculous complications, either during the period at High Wood or the subsequent period of observation, only 4 of these children died. It is reasonable to assume that today with antibiotics the results are, at any rate, not inferior. But our follow-up after residential treatment only covered an average period of 6 years, and, as the mean age in this group at the beginning of treatment was just over 5 years, we could not know the ultimate fate. In this connection, I agree with Seal and Thomas when they say that their " observations of the disease at varying phases suggest many possible end-results depending on the initial damage." In the same way, in considering the fate of all our primary cases at the end of our period of observation, we wrote : " The risks of miliary disease and meningitis have obviously receded into the background. The story of the development of chronic pulmonary tuberculosis in these same children still remains to be unfolded completely." When one considers the marked preponderance of boys with segmental lesions and the shift in the peak of mortality in men towards the older age-groups, one starts to realise how almost impossibly prolonged a completely satisfactory follow-up would be.

The findings of Dr. Seal and Mr. Thomas that cases " with areas of caseation on resolution of the exudate become shrunken, fibrosed and bronchiectatic " are in accord with the clinical experience of others. One of our conclusions was that " segmental lesions are only exceptionally followed by complete restitution ; most often they lead to permanent contraction." At the same time, though minor degrees of bronchiectasis are common, we found that serious bronchiectasis is a rare sequel. In our cases no instance of symptomatic bronchiectasis arose during the period of our observation " amongst

1. Bentley, F. J., Grzybowski, S., Benjamin, B. Tuberculosis in Childhood and Adolescence. N.A.P.T., London, 1954.

children with upper-lobe or single-segment lesions. Involvement of a whole lung, or of the lower lobe (sometimes in association with the middle lobe) on the other hand, carries a heavy incidence of severe bronchiectasis demanding radical surgery in later years." Here also it is likely that a longer follow-up would have drawn attention eventually to more cases requiring operation. In addition instances of minor degrees of ill health must have gone unrecorded.

Your correspondent's account of their main pathological findings will be welcomed. It is particularly informative that they "never encountered simple collapse." But their resected specimens were from children with persistent shadows "of some months' duration" and it is possible that some at least of the opacities which cleared more quickly were not pneumonic.

Your correspondents state that of the different types of consolidation encountered those where the exudate is mainly fluid and with large numbers of foamy mononuclears and only occasional epithelioid tubercles "resolve as would a pneumococcal pneumonia." Referring to this type, and to caseating types, they report that they have found them "indistinguishable both clinically and radiologically when they first appear." This again is parallel to our findings when, in reviewing our cases, we could not, at the outset, differentiate between "consolidation," "collapse/consolidation," and "collapse." But how then do your correspondents decide which cases are suitable for operation?

In children with primary tuberculosis complicated by glandular perforation, Seal and Thomas have found bronchoscopy "of limited value as a therapeutic procedure." I am in complete agreement, but more surely is needed to justify operation.

How little we really know about primary tuberculosis in children. Recently I have studied a series of children with obstructive emphysema. This complication is often symptomless and transient and must frequently be overlooked. The condition may disappear without the occurrence of consolidation. When consolidation occurs it is sometimes in a different lobe. Even obstructive emphysema is not per se sufficient to justify thoracotomy.

The fact must be faced. We do not yet have a satisfactory treatment for tuberculous mediastinal glands—a still too common disorder amongst children. Antibiotics have proved disappointing. Sanatorium treatment and bed rest are of doubtful value. Bronchoscopy is usually ineffective. The work of Dr. Seal and Mr. Thomas must be considered of fundamental importance. Their full account will be awaited eagerly. The work is bound to teach us much about the pathology of tuberculosis. It is hoped that at the same time they will throw some light on the action of antibiotics in primary cases. Not least do we look forward to more details about the indications for operation.

High Wood Hospital for Children, Brentwood, Essex. F. J. BENTLEY.

## THE GREATER MEDICAL PROFESSION

SIR,—I am glad to find that Mr. Trillwood, in his letter last week, agrees with many of my views, but I must comment on two of his statements. I have not overlooked his explanation of the sense in which he used the word auxiliary. It is, however, not Mr. Trillwood's private definition of the term which the world will recognise but the generally accepted one. If pharmacists accept the term "medical auxiliary" they will undoubtedly be regarded as technicians instead of as academically trained professional personnel.

I agree, of course, that we have a responsibility to the medical profession, but it is that of a professional colleague not a subordinate. The anæsthetist has a responsibility to the surgeon whose patient he anæsthetises, and the radiologist a responsibility to the physician or surgeon whose patient he examines, but these responsibilities do not turn such specialists into medical auxiliaries.

University College Hospital, London, W.C.1. T. D. WHITTET.

## INSULIN ZINC SUSPENSIONS

SIR,—In 1954,[1] whilst elaborating a design of insulin trials, we studied in detail I.Z.S. Our conclusions were that the new I.Z.S. appear to suffer from the same limitations as do other insulin preparations.

In 1955[2] we recorded our experience with I.Z.S. in the treatment of 203 patients. Here we stressed that mild, stable cases of diabetes requiring, in addition to diet, a small dose of insulin are probably just as well controlled on I.Z.S. as on protamine zinc insulin (P.Z.I.) or N.P.H. (isophane). Conversely, in the treatment of unstable cases of diabetes mellitus—and we would emphasise that instability is not indicated by the total daily insulin requirement—the I.Z.S. appeared to offer no marked advantage over the use of combinations of soluble insulin and P.Z.I.

Of the 203 patients placed on I.Z.S. three years ago, 196 have been followed up for the three years and 25% have been so unsatisfactory that they have had to be changed to another type of insulin. Moreover, increased medical supervision has been necessary in adjusting the mixtures of I.Z.S. in a further 6%.

Using the terms stable and unstable diabetics as defined by us in 1954,[3] we find that a higher proportion of stable diabetics have remained controlled by I.Z.S., whilst more of the unstable diabetics have been changed to other types of insulin. Analysis of the patients (stable 17, unstable 31) changed from I.Z.S. on to other insulins shows that 81% improved when placed on soluble insulin plus P.Z.I. or soluble insulin plus N.P.H. and other combinations of these insulins, whilst 19% remained unchanged. None was worse on P.Z.I., N.P.H. regimens. Analysis of the patients (stable 51, unstable 17) still retained on the I.Z.S. shows that 19% had improved, 72% showed no change but were satisfactory, whilst 9% showed a deterioration in their control and required restabilisation.

Assessment of control in diabetes mellitus cannot be left entirely to the patient's judgment. Dr. Jersild (Nov. 17) relied for his assessment in 34% of his patients upon replies to a questionnaire. Further, Dr. Spencer and his co-workers (Nov. 17) give no indication of their blood-sugar findings, and without this information the comparison of results is difficult. The concluding sentence in your leader in the same issue suggests that there is little place in the future for the use of globin, P.Z.I., or N.P.H. insulins in the treatment of diabetes mellitus—surely a dogmatic pronouncement born of ignorance. Our experience, and that of many others in this country, Denmark, and America, is that great difficulty has always been experienced in the treatment of the unstable diabetic, whereas simple measures will meet the needs of the majority of stable diabetics. I.Z.S., as at present manufactured, has no special advantage over the other insulins, either alone or in combination with soluble insulin, in the treatment of unstable diabetics. The majority of workers would agree that any patient requiring at the present time more than 80 units of insulin per day would be better advised to have the insulin in more than one injection. The dream of a single daily dose of insulin for all diabetics is not possible with the present-day insulins without running the risk of unnecessary hazards. Furthermore, cumulative action is more frequent with I.Z.S. and I.Z.S. crystalline than with N.P.H., P.Z.I., or combinations of both with soluble insulins.

University Department of Medicine, General Infirmary, Leeds. R. E. TUNBRIDGE
R. G. PALEY.

1. Paley, R. G. *Lancet*, 1954, ii, 784.
2. Tunbridge, R. E., Paley, R. G., Fryers, G. R. Paper read to the Second Congress of the International Diabetes Federation, Cambridge, 1955. (In the press.)
3. Fryers, G. R., Paley, R. G., Tunbridge, R. E. *Lancet*, 1954, ii, 782.

## STEROID-INDUCED GASTRIC ULCER

SIR,—Last week's paper by Dr. Hirschowitz and his colleagues is of considerable interest for its record of laboratory findings before, during, and after the appearance of a prepyloric ulcer; but surely they do not expect us to agree that the corticotrophin they gave the student five days before the appearance of gastric symptoms was the cause of the ulcer. At this centre we have given continuous adrenal-stimulation therapy to 130 patients for an average duration of six months, and have come to the conclusion that one of the important ways in which it is superior to oral steroid therapy is that it does not give rise to epigastric pain or peptic ulceration.

Sheffield Centre for the Investigation and Treatment of Rheumatic Diseases, 77, Gell Street, Sheffield, 3. H. F. WEST.

## CLINICOSIS

SIR,—Several of your correspondents have pointed out the relative advantages of attendance by babies at welfare clinics held by local authorities, and by their own doctors. Wherever many babies are brought in contact with each other, and with adults, they run the risk of catching colds, gastro-enteritis, or worse. Surely, well babies ought not to attend clinics of any sort, but should be examined, immunised, and vaccinated in their own homes, by their family doctor if he has the time, and if not by the staff of the medical officer of health.

Oxford. K. W. LOVEL.

SIR,—Surely the time has come now after much correspondence to make clear the duties of a good general practitioner? If he is to accept continuous care and responsibility for all his patients, under all circumstances, from the moment they come on his list to the day they depart or die, then it follows that the local-authority services, such as clinics and health visitors, are just one more branch of the team of experts that the practitioner can call on or consult. Dr. Warin is very wise when he says, in his letter last week, that the G.P. should be encouraged to take his place as the leader of the team. In that way and that way only can success lie; where there is duplication of work or responsibility the whole medical structure can split up into anarchy.

In conclusion may I ask how the Willink Committee on Medical Man Power can possibly estimate future requirements unless the functions of the largest group of all—namely, the general practitioners—are clearly defined.

Worthing. HAROLD LEESON.

SIR,—However one may apportion praise or blame, success or failure, the tragic fact remains that "the proportion of . . . babies happily on the breast in the fifth month" appears to be getting less and less.

Mitcham, Surrey. L. S. ADAMS.

## COLOUR-BLINDNESS AND INTERSEXUALITY

SIR,—I was interested to read that Polani, Lessof, and Bishop[1 2] have used colour-blindness as a means of determining the genetic sex in Turner's syndrome. I agree that this method may be used in all conditions of supposed intersexuality, and I used it in my thesis on hypospadias.[3] My material was collected before I knew about sex-chromatin. I used the same methods as Goldschmidt[4] in his experimental studies on intersexuality in the moth Lymantria: (1) sex-distribution among offspring; (2) sex-distribution in the sibships; (3) occurrence of sex-linked recessive characters in intersex and their parents.

Among 104 hypospadians I found 7 cases of colour-blindness. Parents, too, were examined, because the sex of a colour-blind child may be determined if one knows the colour-vision of the parents (except in cases where the father is colour-blind). It was found by this method that patients with hypospadias (whether of slight or severe degree) had to be genetic males.

Copenhagen. HANS RAHBEK SORENSEN.

## PREVENTIVE PSYCHIATRY

SIR,—It is something of an achievement to have published last week a leader on preventive psychiatry and two articles (on an integrated mental-health service and on the relief of mental-hospital overcrowding) without once mentioning that the bulk of everyday psychotherapy, almost the whole responsibility for early diagnosis, and a large part of aftercare are carried out by general practitioners. The neglect is not atypical. Many workers in psychiatry seem to consider the patient's psyche too fragile for our rough untutored hands and consequently our coöperation in treatment is seldom invited. Surely, a major contribution to integrated preventive outpatient psychiatry would be to allow G.P.s more time for their patients and more coöperation from the psychiatric services, especially from social workers. We would then be able to refer even fewer of our psychiatric patients to the overburdened specialist services.

The Caversham Centre, London, N.W.5. ANTHONY RYLE.

SIR,—Further to your leading article and Dr. Macmillan's interesting account of the Nottingham services, who can doubt the urgent need of an integrated mental-health service such as Dr. Macmillan describes?

As a medical Member of Parliament, who has achieved a certain amount of publicity in connection with the problems relating to mental illness, proof of this comes to me in my post-bag daily.

Over recent months I have received a total to date of some 200 letters from mental patients and ex-patients in all parts of the country. Only a minority of these are from outright psychotics. The majority are from apparently sensible people who, while admitting to some form of mental or nervous disturbance, yet make it clear that their suffering from their original illness is unimportant to them in comparison with the psychic trauma which they have received, or are receiving, through their treatment.

No-one reading these letters could for one moment be satisfied that all is well with the existing state of our mental-health services. There are clearly two main deficiencies in these. The first is the general failure either to treat mental illness, or even attempt to diagnose it, in its early stages at home or in an observation ward, and the consequent tendency to indiscriminate admissions to mental hospitals, often quite precipitately under certificate—in this connection we are surely excessively naïve if we delude ourselves that we benefit a patient's mental health by subjecting him to methods of removal to hospital which are frequently more reminiscent of those of the Ogpu or Gestapo than those of a therapeutic service. The second is the equal deficiency in arrangements for social rehabilitation into the community, which leads to unnecessarily long stays in hospital—these stays in the peculiar tempo of mental hospital life, being so often measured by years rather than by days, weeks, or months.

These gaps can only be filled by the establishment of a local-authority service with an adequate force of social workers, not only trained, but properly briefed that the aim of their work is to keep the patient, if possible,

1. Polani, P. E., Lessof, M. H., Bishop, P. M. F. *Lancet*, July 21, 1956, p. 118.
2. Bishop, P. M. F., Polani, P. E., Lessof, M. H. *Ibid*, Oct. 20, 1956, p. 843.
3. Sørensen, H. R. Hypospadias: with Special Reference to Etiology. Copenhagen, 1953.
4. Goldschmidt, R. *Bibliogr. genet.* 1933, **11**, 186.

in the community: such a service must, moreover, in defiance of tradition take over the prime responsibility for the mentally sick from the hospital service.

The biggest stumbling-block to the creation of this is, of course, the administrative problem that exists through the separation of local-authority and hospital services, that has been so unfortunately perpetuated under the National Health Service Act. Thus not only is it the fact that money spent by local authority on preventive mental health can only save money, not for local authority but for the hospital service: but also that, in asking the hospitals to relinquish any portion of their responsibility, we are asking them in most cases to relinquish this to an entirely separate department of the health service.

These will be formidable difficulties to overcome. None the less, the time is ripe for a further move forward of local-authority responsibility in this sphere. Provided that sufficient opinion, both professional and lay, is mobilised to will this development, neither somnolent mental-health committees, nor hospitals hidebound by tradition, nor even complacent central authority, can prevent it coming about.

House of Commons,
London, S.W.1. DONALD MCI. JOHNSON.

SIR,—Long will the dumb be at the gate of the deaf. The words of your leading article last week: "there are the shy people who need friends but do not know where to look for them" reminded me forcibly of the many actual and prospective alcoholics in our midst.

That so many of us, including the National Health Service,[1] appear deaf here, arises mainly from the still-prevailing confusion, in the public mind and also the doctor's, knowing little difference between the "drunk" and the alcohol patient. That the latter can be helped to lead a sober and, what is more, a useful and contented life, is shown daily by the example of Alcoholics Anonymous—preventive psychiatry, I would say, at its best.

We doctors might well feel a little envious, a little ashamed, that a body of non-doctors should more ably, more willingly, have taken in hand a condition pertaining, after all, to medicine. Preventive psychiatry may have something to learn from this

Wyke House, Isleworth,
Middlesex. H. PULLAR-STRECKER.

SIR,—We welcome your leading article and in particular your suggestion that further use should be made of that section of the National Health Service Act which empowers mental hospitals to notify the appropriate local health authority of the discharge of a patient, so that aftercare may be arranged by the local authority.

The National Association for Mental Health has pressed for some time the importance of using this provision of the National Health Service Act to the full: we recognise however that everything depends on the quality of the social work available to help psychiatric patients who are living in the community. The shortage of psychiatric social workers is acute, and at present there is no systematic training for other mental-health social workers employed by the local health authorities. No amount of good intentions will make up for this lack of training. This is in no way to deny the value of the work done by many experienced officers who have been the first to press for adequate training.

The National Association for Mental Health hopes that the Younghusband Committee, which is at present examining the function, recruitment, and training of local-authority workers, will pay particular attention to this point: we believe it to be of cardinal importance to the future of the mental-health services.

National Association for Mental Health,
39, Queen Anne Street,
London, W.1. MARY APPLEBEY
General Secretary.

1. Pullar-Strecker, H. *Lancet*, 1955, i, 1072.

## CURARISATION WITHOUT ANÆSTHESIA IN THE TREATMENT OF TETANUS

SIR,—Artificial respiration by intermittent positive pressure through a cuffed tracheotomy tube has been used in the treatment of tetanus after full curarisation. During the past two years a series of fatal cases due to bone-marrow depression has been reported.[1–3] For a while the cause of this complication was obscure, but the prolonged nitrous-oxide narcosis has been shown to be the probable cause. From our experience, which agrees with that of others,[4] the patient does not need this narcosis; small doses of sedatives are sufficient. I briefly report a case which has been published only in Norwegian.[5]

A boy aged 13, who had scratched his knee five days before, complained of difficulty in chewing, and during the next day his neck and back became stiff. Treatment was given for four days according to the conventional method with thiopentone, chloral, and ether in oil. He suddenly collapsed with massive lung atelectasis; tracheotomy was performed and an inflatable cuff-tube inserted. A full dose of *d*-tubocurarine was given in order to provide adequate ventilation, which would otherwise have been prevented by the tetanic spasms. Intermittent positive-pressure ventilation was started with a 50-50 mixture of oxygen and nitrogen. This treatment was carried out for fourteen days, using about 2700 mg. of curare. Our patient made a complete recovery and had normal hæmoglobin values and white blood-cell counts. We could communicate with him during the treatment, and he denied having pain when sufficient curare was given. He did not seem to be very afraid, and after his recovery he said he remembered very little of the whole episode.

Rikshospital,
Oslo, Norway. NILS HELSINGEN.

## PETECHIAL RASH ON THE PALATE IN INFECTIOUS MONONUCLEOSIS

SIR,—Some time ago Holzel[6] underlined the frequency of petechial eruption on the palate in infectious mononucleosis, and the great diagnostic value of this manifestation, especially in the initial stage of the disease.

In the past year we have seen in our clinic 20 cases of infectious mononucleosis in children aged 3–5 years. All were admitted with a false diagnosis of throat diphtheria. Under the influence of Holzel's article we observed the palate carefully, and we found petechial eruptions there in 12 cases; no child had a skin rash during the illness.

In 3 of the 12 cases the palatal changes conformed with those described by Holzel. The rash, which appeared on the 3rd, 5th, and 7th day after the onset of the illness, was localised to the junction of the soft and hard palate. The petechiæ were not numerous, were somewhat bigger than pinheads, and differed in shape. They persisted for 3–4 days and faded slowly, leaving a yellowish discoloration for another few days.

In a further 3 children we found on the palate on the 4th, 6th, and 7th day a few vesicles, of uneven shape, less than 0·1 cm. in diameter, scattered irregularly. In 2 cases, after 1 day the vesicles changed to spot-like small petechiæ, and after a further 2 days they disappeared leaving a yellowish discoloration. In the 3rd case the small vesicles formed one big blister filled with a jelly-like substance. The blister vanished completely after another 2 days.

In the remaining 6 cases we found, between the 4th and 7th day, small spots on the whole palate, irregularly grouped. They vanished after 2–3 days leaving a yellowish discoloration for another few days.

1. Lassen, H. C. A., Bjørneboe, M., Ibsen, B., Neukirch, F. *Lancet*, 1954, ii, 1040.
2. Lassen, H. C. A., Henriksen, E., Neukirch, F., Kristensen, H. S. *Ibid*, 1956, i, 527.
3. Wilson, P., Martin, F. I. R., Last, P. M. *Ibid*, Sept. 1, 1956, p. 442.
4. Smith, A. C., Hill, E. E., Hopson, J. A. *Ibid*, Sept. 15, 1956, p. 550.
5. Helsingen, N. jun., Kristensen, H. P. *Tidsskr. norske Laegeforen.* 1953, **73**, 805.
6. Holzel, A. *Lancet*, 1954, ii, 1054.

In all 12 cases the petechial eruption on the palate was one of the first signs of infectious mononucleosis. The typical hæmatological and serological changes appeared much later.

Petechial eruption on the palate is a valuable sign of infectious mononucleosis and can often lead to early diagnosis.

Clin'c for Infectious Diseases of Infancy, Warsaw, Poland. H. SZCZEPAŃSKA.

## SUBMUCOUS TELANGIECTASIS OF THE COLON

SIR,—One may, though very rarely, meet with a child who, though otherwise apparently quite normal, shows congenital enlargement of a segment of a single superficial vein. Such cases have been classified under the heading of "congenital varicose veins," and may, I suppose, by a slight stretch be included under abnormalities of hamartomatous origin, though I am not sure whether the introducer of the term "hamartoma" (a swelling or tumour due to local tissue development having gone astray) would have allowed this. I have described it as "a local dysplasic dilatation and thickening of veins (phlebectasis) of any portion of the body, allied to hamartomatous changes, a kind of local venous gigantism," superficially analogous in the alimentary tract to congenital megalocolon (Hirschsprung's disease); the ordinary causes of varicose veins are not present. Arteries may also be involved (phlebarteriectasis).[1 2]

I understand that Mr. A. G. Rutter regards his most interesting and successful case (Nov. 24) from the pathological point of view as representing an analogous condition in the colon.

London, N,W.1. F. PARKES WEBER.

1. Weber, F. P. *Brit. J. Child. Dis.* 1918, **15**, 13; *Ibid*, 1936, **33**, 102.
2. Weber, F. P. Rare Diseases and Some Debatable Subjects. London, 1946; p. 55.

# Parliament

## Doubts on Domiciliary Treatment of Tuberculosis

IN the spring an anti-tuberculosis campaign is to be launched in Scotland, which may well find 1000 new cases. This possibility led Dr. J. DICKSON MABON, in an adjournment debate on Nov. 22, to explain the doubts which he feels about the long-term results of domiciliary treatment. He suggested that doctors were beginning to see the apparent failure of some part of this treatment, and he quoted a letter from one saying:

"I have recently seen two cases who had been on domiciliary chemotherapy and who had relapsed during the course of treatment. The answer was that in neither instance was the patient troubling to take the drugs prescribed."

Dr. Mabon did not claim that he had figures broadly to substantiate this, but he believed that little warning bells were sounding. All over Scotland a few relapsed cases were trickling into the rooms of chest physicians and the surgeries of general practitioners. Because the patients had not taken the drugs regularly they arrived back infected with bacteria resistant to the antibiotics and to the new chemotherapeutic drugs. He asked the Minister for an assurance that in the propaganda issued by his department there was not an undue stress on the claim that we could treat people at home and that they would not have to go to hospital at all. Dr. Mabon held that all patients with respiratory tuberculosis should receive part of their treatment in hospital. He would like to see the Department of Health organise a pilot survey to assess the effect of domiciliary treatment.

Mr. J. NIXON BROWNE, joint under-secretary of State for Scotland, said that the Minister had not received representations on this matter from anyone except Dr. Mabon. Even in Dr. Mabon's constituency the area chest physician had no difficulties to report and had received no complaints from the general medical practitioners in the area. This was not a matter which could be debated; it required an impartial medical approach and his department would carefully examine the points raised.

The choice of hospital or home treatment, or a combination, was a matter for the doctor in charge of the patient to decide, and Mr. Nixon Browne thought that it would be unwise for any Government to interfere in a matter of this kind. He would prefer to leave it to the judgment of the medical man on the spot, but he would like to make it clear that the doctors on the spot had a free choice in this matter. There was no question of any pressure being put on them to treat a patient at home because of shortage of beds. Nearly every sanatorium now had some empty beds. Waiting-lists which stood at 1700 three years ago had vanished except for a handful of patients who had to wait for a short time because they wished to get a bed in a hospital near home. It was clear that doctors had been giving patients an increasing amount of home treatment. One reason was the early ascertainment of tuberculosis through mass radiography and other means, which threw up cases for which home treatment was satisfactory at some stage. The extended use of drug therapy had also reduced the time spent in hospital by tuberculous patients. Home treatment had its own particular safeguards. The patient was in the immediate care of his own family doctor, while the treatment he got was under the supervision of the chest physician. The family doctor not only knew the past history of the patient and his family but was able, in consultation with the chest physician, to apply the latest in scientific methods of treatment to his patient. This was in full harmony with the Department's policy of giving the general practitioner every chance of widening and enhancing the range of his work. Finally, if home treatment was not successful, the chest physician could arrange for the patient's admission to hospital immediately.

He agreed that the tuberculosis problem in Scotland was too big to be looked at with any complacency, but there had been favourable trends within the past year or two. Despite the increasing use of diagnostic services the notification-rate was still falling, if somewhat slowly, and the death-rate was halved between 1951 and 1955. He assured the House that the department would keep a close watch on the issues raised by Dr. Mabon, to ensure that nothing was being done to endanger these favourable trends.

## QUESTION TIME

### Refunds for Prescription Charges

On the basis of the number of refunds made last year, the additional cost of Assistance grants to cover the increased charges for National Health Service prescriptions would be about £320,000 in a full year.

### Grants Towards University Expansion

Mr. HENRY BROOKE, the financial secretary to the Treasury, speaking in the House of Commons on Nov. 21, said that the universities had already made proposals to the University Grants Committee which, taken together, would increase the number of students from 84,000 in the academic year 1955–56 to 106,000 by the mid-1960s. Of this increase, it was expected that about two-thirds would study science or technology. This increase could not be met without building much new accommodation of all types. The Government were convinced that this was a sound long-term investment and, accordingly, had given authority for university building projects up to the value of £10·4 million to be started in 1957, £12 million in 1958, and a further £12 million in 1959, over and above the large sums required for the expansion of Imperial College. These amounts were instalments of what would be needed over a longer term, and they compared with starts of £4·8 million for the current year, which meant that the present rate of starts was to be more than doubled. But, large though this increase was, the Government believed that the universities should be encouraged to expand even more. The University Grants Committee had advised them that a larger expansion would be desirable if resources could be made available, and the government were giving further thought to this in consultation with the committee.

# Obituary

## LIONEL ERNEST HOWARD WHITBY

Kt., C.V.O., M.C., M.A., M.D. Camb., F.R.C.P., Hon. D.Sc. Toronto, Hon. LL.D. Glasg., D.P.H.

Sir Lionel Whitby died in London last Saturday, only a few weeks after concluding his visit to Australasia as Sims travelling professor. At 61 he still had much to do, but he had done a great deal in an eventful life. He had distinguished himself successively as soldier, as pathologist, as military administrator, as professor, as master of a college and ruler of a university, and as a man who could speak for his profession. All this was achieved, too, despite a disability which must have wearied him though he made others forget it.

[*Topical Press*

Some will remember seeing him first in the dissecting-room at Cambridge in 1919—a very young major, with a Military Cross and a leg amputated above the knee, whose gallantry was evident in his worn face and mischievous grin. Of a Yeovil glove-making family, he had won a scholarship at Downing College in 1914, but had gone straight from Bromsgrove School into the Royal West Kent Regiment. As a machine-gunner, he had served in France and on the Salonika front, and had finally been wounded near Peronne on March 23, 1918, when his life may have been saved by the blood-transfusion he received.

At Cambridge he maintained himself on his pension and his scholarship, and at the Middlesex Hospital he was again a scholar and prizeman. Here too his determination to overcome his physical handicap was an inspiration to many. But when he qualified in 1923 his choice of work was limited by the need to be mainly sedentary, and he became one of Professor McIntosh's assistants in the Bland-Sutton Institute of Pathology. Valuable though this experience could be, it was by no means necessarily a step towards fame or fortune; and until the beginning of the late war Whitby held in fact no higher post than that of assistant pathologist and bacteriologist to the Middlesex. But he was a man who made his own opportunities. Proving his ability both as bacteriologist and as hæmatologist, he was given full responsibility for most of the clinical pathology of the hospital. And, a clinician by instinct, he found himself as much at home at the bedside as at the bench.

In the '20s such men were rare; and Whitby's capability attracted the notice of Lord Dawson, with the result that he became an important member of the medical team which treated King George V during his illness of 1929. His help was increasingly in demand, and his private practice became so large as to give him a period of affluence. But he continued his hospital work and his researches, and he had an important success when his experimental studies of well over a hundred sulphonamides, made in the laboratories of Messrs. May & Baker, enabled him to establish that sulphapyridine (M & B 693) is effective against pneumococci. Though later miracles with antibiotics may have made this discovery seem less exciting, its impact, and its consequences in the saving of life, were very great. And though such techniques of investigation are nowadays familiar, the work of Whitby and his assistants succeeded only because of their intelligent and indefatigable accuracy. As he later remarked (with characteristic lightness of touch) in his inaugural lecture at Cambridge as regius professor of physic, "the drugs usually had to be administered by stomach tube, and it requires much practice, considerable skill, and a little art to pass a stomach tube in a mouse, and, at the same time, to avoid being bitten."

This was a cheerful part of his life. He had abundance of useful things to do and everyone enjoyed working in his laboratory.

"My first recollection of seeing him," S. R. M. B. recalls, "was in 1924. On this first occasion he was smiling; and, although towards the end of the following 22 years that I was in close daily contact with him, the smile may have become a little less frequent, because of his greater responsibilities and the trying years of 1939–46, I soon learned that smiling was his normal state and reflected his genial nature and even temper—unless he felt thwarted in his work! Those were happy days in the laboratory, working long hours—he worked from 9 to 7.30—with Sir Lionel setting the pace with excerpts from Gilbert and Sullivan."

More important to him even than his work was his family. He and his wife, who had been a fellow medical student at Cambridge, had four young children, and though they lived in London they had a country house near Bridport, on the border of Dorset and Somerset, where his family had fished the same beat of the Frome for a hundred years. When there were no trout there was a garden on which he used his talent as artist and biologist.

There were also his books. As an investigator, his strength lay in recognising fundamentals and in reducing complexities to simple forms; and it was this that made his lectures so fascinating and helpful and his three textbooks so pleasing.

Reflecting on his career, S. R. M. B. points out that, though at first he was more a bacteriologist than a hæmatologist, it was through his work on the blood that he came to what were perhaps the three chief milestones of his life. The first was when he was asked by Lord Dawson to see a patient supposed to have lymphatic leukæmia, and when he changed the prognosis by diagnosing glandular fever—a condition then barely recognised. The second was when he was approached by his publishers for a book on hæmatology: they had in mind a relatively small one like his *Medical Bacteriology*, but they were given a reference book now used the world over as Whitby and Britton's *Disorders of the Blood*. The third was his acceptance in 1939 of the command of the Army Blood Transfusion Service.

The attempt to create a comprehensive transfusion service, as part of the Army itself, presented great difficulties. With laboratory staff drawn chiefly from the Middlesex Hospital and the Royal College of Surgeons, a depot was established near Bristol, and a panel of 5000 donors was obtained even before war broke out. Necessary research on the keeping properties of blood, and the merits of various blood substitutes, was quickly undertaken, and units were sent abroad. But an organisation

of this kind was something to which many Army methods and regulations did not conveniently apply; and, though the medical department of the War Office did all in their power, Whitby had many obstacles—administrative as well as technical—to overcome if he was to satisfy the complex needs of a rapidly growing Force. His original establishment was intended to provide about 100 pints of blood daily; but towards the end of the war the service was in fact collecting 1200–1300 pints, and producing vast quantities of dried plasma, as well as equipment, for distant theatres of war. Bristol, where work was for a time made harder by frequent bombing, was not only a depot for collecting and processing blood, but also a central training centre for transfusion officers, where instruction was given both to doctors and to other ranks, and base and field transfusion units were organised. This training was admirable, and fine work was done both at home and abroad. But if Brigadier Whitby eventually commanded a service which was fully equal to the demands made on it, and which is regarded as one of the medical successes of the war, it was by the long travail associated with innovation.

After the war, he was in some doubt what to do. But the uncertainty ended when Cambridge decided that, in the new world of medicine, it could think of a pathologist as regius professor of physic. Accepting this chair in 1945 he found plenty of work awaiting him. Professor Ryle had resigned in the early years of the war, and it was necessary virtually to replan the future of the medical school at a time when all the other faculties were endeavouring to meet their own needs in post-war expansion. Whitby set about his task with tremendous enthusiasm—and put a notice entitled "Medical School H.Q." over the door of the temporary hut allotted to him at the back of Downing College.

At first all went well. New departments, the university health service, a statistical service, and arrangements for postgraduate training, materialised with remarkable speed. Then came the difficulties created by the differences between medical and non-medical stipends, the lack of hospital accommodation, and the abolition of the earmarked grants for medical education; and he suffered some setbacks. For all his courage, he was a sensitive man, and he did not take defeats lightly. For a short time it looked as though his efforts to build up the Cambridge Medical School might be only partially successful. But he soon took on additional tasks.

"His appointment as regius professor gave great satisfaction," writes S. C. R.; "but it was after his election to the mastership of Downing that he entered into the full tide of university life. When he was approached about the vice-chancellorship in 1951, there were many who doubted whether, with his other responsibilities, he would undertake the heavy burden involved. But he accepted it, as he had accepted so much else, with a light heart." His new duties required him to work very long hours; but, with the constant help and support of his wife, he made an outstanding vice-chancellor, and won the respect of all members of the university.

Of this period, L. B. C. says:

"I think the keynote of his success was his power to make people work happily together. It was partly this which made him such an admirable chairman of committees, partly that all his agenda were meticulously prepared, while he could often overcome opposition by tact and friendliness so that there was no unnecessary waste of time. He was also a shrewd judge of character, whether as an examiner or in choosing the man for the job. In Cambridge these gifts were of great value in building up relations between the hospital services and the university: but for his influence many changes would not have come about so smoothly and there would have been many more difficulties still unsolved.

"He had a strong sense of duty; his approach was friendly and direct; and he had the simplicity that goes with greatness. Success never changed him and he always kept his sense of fun. There are few here who will not feel that they have lost a leader and a friend."

Another of his associates, A. L. B., sums up this phase:

"When attempting to measure a man's achievements it is best first to record concrete examples. The plans and site for the new hospital, now approved; an established medical school; the new buildings and chapel at Downing, all these can be seen. Less tangible, but equally real, was his influence in raising the status of medicine, both within the university and in the outside world. . . . It is most unfortunate that he was not spared to consolidate his work, for much remains to be done. But the climate of opinion in Cambridge is now well-disposed towards medicine, and in this Whitby's work and personality have played a vital part."

When in 1948 the annual representative meeting of the British Medical Association was held at Cambridge, Whitby was elected president. It was by no means an easy year. The National Health Service had been introduced; the Amending Bill was still before Parliament; the B.M.A. was itself divided. Through this stormy period he filled his presidential rôle with ability, grace, and tact; and he was also active in central committee work. As one who helped to establish the Joint Consultants Committee, formed by the Royal Colleges, the Scottish Corporations, and the B.M.A., he was for the first three crucial years its chairman.

A further valuable contribution to medicine was his presidency of the first International Conference on Medical Education held in 1953, and his chairmanship of the committee which is preparing for the Chicago conference in 1959. To these and many other bodies, both national and international, he gave willing and expert counsel.

His fellow pathologists, however, will think rather of his presidency of the International Society of Hæmatology, meeting at Cambridge in 1950; of the first International Congress of Clinical Pathology in 1951; and of the Association of Clinical Pathologists itself. Because pathology was his professional home, we return to it in this tribute from E. C. D.:

"From 1923 onwards Whitby developed an expert knowledge of bacteriology, and from the very earliest it was quite clear that his main interest lay in its clinical application. By the '30s he had become the most prominent figure in what used to be called 'clinical pathology,' and had he so desired, he could have given up all academic work and devoted himself fully with great profit and honour to this side of the medical profession. This he did not do, but went on working in his laboratory on the second floor of the Bland-Sutton Institute. Despite the honours that had been showered on him, the eulogistic comments of the medical press, he continued to work seated on his tall high-backed wooden stool in a rather torn white coat, working away with his own hands and at the same time interviewing all who came for advice and assistance. He had the same curious ability to listen and advise and work that was possessed by the late Sir Frederick Gowland Hopkins.

"This picture of Whitby seated in his laboratory is one that will remain with all who knew him. There appeared always to be a certain monumental calmness and immutability, combined with extreme friendliness and frankness. His humour was in many respects that of the countryman, and when later he rose to great eminence he was still the same person that sat on the tall stool in the torn white coat on the second floor of the Bland-Sutton Institute."

We come back from the career to the man himself and why a great many people will like to think of him. Partly it was because of his humour, which ranged from the delicately academic to the pleasantly earthy, and was never very far from the surface—so that, though he could be formidable, he was never pompous, and knew exactly how and when to temper his dignity with a trace of impudence. Partly it was because he had the clinician's genuine interest in others—so that there was

true good will behind "his facility for remembering faces and names, with a little jest appropriate to each person, which throughout his life endeared him to so many." And it was partly his zest. But, in examining his effect on those around him, Lord Moran points also to his greater qualities:

"When the war ended, Lionel Whitby was 50; he was held in high regard in England and in America as a clinical pathologist, while as an author his books had run into many editions. In short, the shape of things to come seemed plain for all to see. And then we heard that he had been appointed regius professor of physic at Cambridge, an office associated in our minds with some of the great physicians of the past, and that his old college had invited him to be master. His success in this new life, as we now know, was immediate, outstanding, and enduring. How came it that Whitby's translation to another world was so generally endorsed by the elect?

"In trying to answer that question I must leave to others the measurement of his contribution to his subject, of his worth as a craftsman; but I should like to add a postscript to those tributes, because I believe it may account at any rate for the surface anatomy of his achievement. The average Englishman takes some time before he accepts a stranger. Whitby was allowed to skip that time of probation. Men took to him at sight. During the war he came with us to Canada. The soldiers and sailors surrounding Mr. Churchill were not as a rule particularly forthcoming; they were preoccupied with their own difficulties and problems; they were certainly not in the habit of sharing their views with a stranger. However, on the second day at sea I noticed Whitby hobnobbing with all and sundry. When peace came this gift for friendship made him a cherished ambassador in America and in England. And if they loved him as a visitor, for his part his spirits rose when he found himself once more on the move.

"Most successful men in their sober moments will admit that the recipe for success is hard work. Whitby's diligence was sometimes hidden by the lightness of his touch. When there was work to be done, he made night into day.

"And this brings me to the second quality I wish to stress—his strength of purpose. The most obvious example of his will-power was the manner in which he made light of his disability. I recall one dark night in the war when I was groping my way down some stone steps that were slippery with seaweed; you could hear the water lapping at the bottom. I looked round to see if Whitby with his missing limb was all right, but he laughed at my fears as he cheerfully hobbled down. It was no accident that he lost his leg in the first war not as a doctor but as a machine-gunner. And in the larger affairs of life you could depend on him; once he had made up his mind his purpose did not waver."

* * *

The second son of the late Benjamin Whitby of Yeovil, L. E. H. Whitby married in 1922 Ethel Murgatroyd, M.R.C.S.; and of their three sons two are members of the medical profession. He was appointed C.V.O. in 1929 and knighted in 1945. He was Bradshaw lecturer of the College of Physicians in 1938; John Hunter medallist of the College of Surgeons in 1939; gold medallist of the Royal Society of Medicine in 1945 and of the Society of Apothecaries in 1948; and Cutter lecturer at Harvard in 1946.

## DAVID MURRAY LYON

M.D., D.Sc. Edin., F.R.C.P.E., F.R.S.E., D.P.H.

Professor Murray Lyon, who died in Edinburgh on Nov. 2, at the age of 68, retired three years ago from the chair of clinical medicine in the University of Edinburgh. Three years with the R.A.M.C. in the first world war was the only break in forty years of service which he gave to the Royal Infirmary and the University of Edinburgh.

He was the son of Mr. W. M. Lyon, M.R.C.V.S., of Wooler, Northumberland, and he was educated at George Watson's College and the University of Edinburgh. He graduated M.B. in 1910, and his election as president of the Royal Medical Society of Edinburgh marked him as a young man of promise. Before the interruption of the 1914–18 war he had one foot in pathology under W. G. Greenfield, and the other in clinical medicine in the Royal Infirmary, and when his war service ended he was at first undecided whether he should continue with pathology (which was the safer) or embark on the uncertain but more attractive career of clinical medicine. On his return to Edinburgh, he finally chose clinical medicine; and his choice was soon rewarded by his appointment as assistant physician to the Infirmary in 1919. A year later he became assistant and lecturer to Prof. J. C. Meakins in the new clinical chair of therapeutics. In 1924, on Professor Meakins's translation to McGill University, Murray Lyon succeeded him. This was astonishingly rapid promotion for a young man who, only six years before, had been so uncertain where his future lay. But in fact there was nothing surprising about it; for Murray Lyon already had the rare attributes of a scholar—accuracy, perseverance, enjoyment of dull details, and careful judgment. From 1924 onwards he remained a hospital physician with the bent of a scholar, and a predominant interest in therapeutics. He held the chair of clinical therapeutics for about twelve years and during this time the output of valuable articles both from himself and from his assistants was impressive.

[Swan Watson

Then there was a change. He agreed to give up the chair of therapeutics and to become professor of clinical medicine. Articles continued to come from his pen; but now, in a colleague's vivid phrase, "they smelled less of the laboratory and more of the hospital ward." This last phase of his career as a clinical teacher, resting on the rock of the medical sciences, lasted about fifteen years. Early in it, his book *Essentials of Medical Treatment* was published in 1939.

C. McN. writes:

Murray Lyon was indeed a test-case of the saying that "it is not possible to serve two masters"; and, in this one case of himself, he found that he could not meet the twofold demands of the laboratory, and of the hospital wards (in caring for the sick and in teaching and examining students). The benefit to himself was in the enrichment and the wider range of his clinical teaching. The benefit to the whole medical school was in the rehabilitation and restoration of clinical teaching in Edinburgh towards its primary position in the medical curriculum. In this respect Murray Lyon was not the only "restorer"; but the example of a man of his qualities of intellect and character was strong.

In his clinical lectures, delivered to large audiences of students and postgraduates, and illustrated by patients, his matter was dry as a scholar's discourse should be dry; but sharpened by a quiet and dry humour. He had no showmanship or histrionic tricks. His bedside teaching was more informal, but equally quiet and arresting. And his manner was courteous, both to the student in his errors and ignorance and to the patient in his illness.

How did this busy hard-working clinician and teacher find relief and distraction from his severe daily routine? Not as most other men. He was a gardener and botanist; and right against the Pentland Hills he laid out a landscape garden on the slope with a little winding stream, beautified with unusual plants and flowers. In his reading he liked to get back into ancient history, and he was an authority on British regiments, and on the legends of King Arthur. For years he refreshed his mind with a daily diet of proofs for the *Edinburgh Medical Journal*. Even in his amusements he did not lay aside the habits of the scholar.

He was president of the Royal College of Physicians of Edinburgh in 1945–46, and he carried out his duties

with outward dignity and business competence. Like every important medical corporation of the time, the college was then faced with fundamental questions of policy; and in dealing with these, Murray Lyon combined admirably impartiality in the chair with a clear strong lead on committee.

Professor Murray Lyon leaves a widow, two sons and a daughter.

### DENIS CHARLES CARROLL

M.A. Camb., M.R.C.S.

Dr. Denis Carroll, medical director of the Portman Clinic, London, and president of the International Society for Criminology, died on Nov. 21.

He was born in 1901 at Flixton, Lancs, the younger son of the late A. J. Carroll, a Liverpool merchant. From King's School, Chester, he went with a mathematics scholarship to Trinity Hall, Cambridge, where he took a double first in the natural sciences tripos. He was awarded the Arnold Forster studentship, and while working in Barcroft's department continued his medical studies, which he finished at the London Hospital, qualifying in 1927.

He was soon attracted to psychological medicine and became an assistant medical officer at the Maudsley Hospital. With a thorough grounding in clinical psychiatry he passed on to psycho-analysis and became a member of the Psycho-Analytical Society. His scientific bent was not satisfied by his private practice, and he was drawn to the study of delinquency. Soon he joined the Institute for the Scientific Treatment of Delinquency, and saw it through its struggling years from 1932 onwards. He was director of its research project, as well as a member of its council, and when, under the National Health Service, it became the Portman Clinic he was appointed medical director.

During the late war he served in the R.A.M.C., reaching the rank of lieut.-colonel. At first he was in charge of the treatment of officer psychiatric casualties at Dumfries Military Hospital. Later he became command psychiatrist to Western Command, where he helped to design courses in man-management for officers of Artillery units. His scheme for a halfway centre between a hospital and a convalescent camp for the reablement of cases of neurosis was not put into effect until a similar one for returning prisoners-of-war emerged as the civil-resettlement unit. At the end of the war he was in charge of the largest psychiatric unit in the Army—Northfield Military Hospital, Birmingham, with 1200 beds.

After the war his reputation grew rapidly, and in 1950 he became president of the International Society for Criminology, and presided at the congress held in London last year; and until his death he was editing the transactions awaiting publication. He was a member of the Home Office's advisory council for treatment of offenders, advisory board for training in probation work, and children and young persons committee. He had been chairman of the medical section of the British Psychological Society, and he had served on the council of the Medico-Legal Society, and as a member of the joint committee of the British Medical Association and Magistrates' Association. Before the war he had been an adviser to the Q camps.

E. M. writes:

All through his busy life Dr. Carroll continued to exhibit his skill as an analyst, as well as concerning himself with the various efforts to give delinquency studies a scientific foundation. His mind was always expressing itself in scrupulous concern for detail and, at the same time, an interest in general principles in a new subject which, social as well as psychiatric, demands balanced judgment, scientific detachment, and human sympathy. In all his work he never left any loose ends, and his comparatively modest output of writings was due to his hesitation to print what might in his view prove to be hasty or ill-considered judgments. In criminological psychiatry his death leaves a gap which will not easily be filled.

Dr. Carroll leaves a wife and two young sons.

## Notes and News

### PETROL RATIONING

UNDER the arrangements for meeting the essential needs of doctors, those employed by hospital boards or committees, executive councils, or local health authorities will be provided with petrol coupons from the allowance made to the respective authorities. Among those for whom higher allowances will be available on individual application are consultants so far as their private practices are concerned, doctors in general practice, and home nurses and midwives independently employed. In all these cases as soon as the basic ration-book is drawn application should be made on form P.R.1 (obtainable at all main post offices and local taxation offices) which, with the car registration book, should be sent at once to the regional petroleum officer. Consultants and doctors are asked to mark their application envelopes with the word "DOCTOR" in capital letters in the top left-hand corner. The hospital consultant or doctor should *not* apply for a supplementary allowance for essential car journeys made while on hospital duties. These needs will be met where necessary by the hospital from its own allocation of coupons.

### AN APOTHECARY'S CASHBOOK

A TRADE bulletin issued by Messrs. May & Baker lately gave an account of an old apothecary's cashbook, reproducing and translating two of its pages, together with a letter of slightly more recent date. The book was found in the loft of premises now occupied by a Shrewsbury seed-merchant. The script is on the whole clear. It dates from the years 1706 and 1707.

We learn that metals and other chemicals were much in demand—particularly antimony, copper, vitriol, borax, saltpetre, arsenic, sulphur, iron, white and red lead, graphite, and gold and silver. Gold and silver were sold by the book, the leaf, or the shell; thus "1 book Gold 2*s*. 3*d*." (sometimes 2*s*.), "2 books gold 4*s*. 6*d*.," "4 books Gold 9*s*.," "1 leaf of Gold 1½*d*.," "fol aur n°i 2*d*." (the apothecary seems never to have adopted any firm rule about the use of English or Latin for entries), "shell Gold 3*d*.," "1 shell Sylver 2*d*." Silver was nearly always bought by the shell. There was also, as appears from the transcript, another quality of gold known as Dutch gold, which was sold at prices ranging from 3*d*. to 4½*d*. per book. Many customers appear by name. Dr. Bennion and his boy were continually in and out and Mr. Wolly appears either to have been a confirmed hypochondriac or to have suffered from a remarkable degree of colonic stasis, so great was his consumption of purging potions. Profitable excursions outside the usual dispensing work were the performing of certain practical services, such as blood-letting. This was entered variously as "bleeding," "blooding," or "by phlebotomy" and brought in amounts up to 2*s*. 6*d*., though 6*d*. and 1*s*. were the usual charges. Clysters (enemas) cost 4*d*. "A vomit" also cost 4*d*. and is quite a common entry; but whether this indicated the dispensing of an emetic, tickling the back of the throat with a feather, or holding the head of the unfortunate, is not made clear. The cashbook is to be presented to the museum of the Pharmaceutical Society.

### ONE DOCTOR IN HIS TIME

Dr. Bethel Solomons has played many parts. Although at times his professional work has kept him immensely busy he has never allowed himself to become obsessed with medical matters to the exclusion of everything else. His autobiography [1] shows this clearly. He is a past master of the world's most famous maternity hospital, an obstetrician and gynæcologist with an international reputation, an old Irish rugby international, a leader of liberal Jewry, a keen and accomplished huntsman, a proud Irishman, and a foremost figure in the Irish literary and artistic renaissance. He has written an entertaining and very readable book—full of wise saws and modern instances in the shape of obstetrical case-notes told with a generous measure of Irish blarney and garnished with many stories. Dr. Solomons, now seventy, is still in the fifth age; for he retains his mental and physical alertness and is an active hunter. Long may he so remain to give us, if possible, a second volume of his memoirs. But if he does his proof-reading should be more accurate—particularly the spelling of the names of his gynæcological friends.

1. One Doctor in his Time. By BETHEL SOLOMONS, M.D., F.R.C.P.I., F.R.C.O.G. London: Christopher Johnson. 1956. Pp. 224. 18*s*.

## MEMORIAL TO JOAN MALLESON

FRIENDS, colleagues, and patients of the late Dr. Joan Malleson who wish to give practical expression to their affection and admiration of her are asked to send donations to the treasurer of the Family Planning Association (64, Sloane Street, London, S.W.1) to help branches of the association to start special sessions providing advice on marital difficulties.

## PRIZES FOR RESEARCH IN GENERAL PRACTICE

THE awards committee of the council of the College of General Practitioners will judge the entries for the newly announced "Benger prizes for original observations in general practice." Benger Laboratories Ltd. have established these prizes, of which there will be three each year—£250, £150, and £100. The object is to publicise any means of diagnosis or treatment discovered by a general practitioner and proved in his own experience to be valuable. Entries may take the form of an essay, a report, or a conventional medical paper. It is emphasised that no merit will attach to any particular literary form and the sole criterion will be the value of the observation as a contribution to general practice. The prizes are open to general practitioners actively engaged in general medical practice anywhere in the world, not necessarily members or associates of the College of General Practitioners. The first awards will be made next year and the closing date will be July 31, 1957. Further details may be had from the Chairman of the Awards Committee of Council, College of General Practitioners, 54, Sloane Street, London, S.W.1.

## U.S. NATIONAL LIBRARY OF MEDICINE

THE U.S. National Library of Medicine, formerly called the Armed Forces Medical Library, is now operated as part of the U.S. Public Health Service, Department of Health, Education, and Welfare.

The library is preparing an annotated list of card-form publications in medicine and related fields. The list will include publications which appear on perforated or lined sheets as well as those on separate cards. Those issuing such publications are asked to communicate with Mrs. Jane M. Fulcher, reference section, National Library of Medicine, Washington 25, D.C.

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### University of Cambridge

On Nov. 17 the degree of M.D. was conferred on T. S. L. Beswick and R. A. Boardman.

### University of London

Among the honorary degrees which Queen Elizabeth, the Queen Mother, as chancellor of the university, conferred on Nov. 23 was the degree of LL.D. on Sir Harold Himsworth, F.R.S.

Dr. I. M. P. Dawson has been appointed to the readership in pathology at Westminster Medical School.

Dr. Dawson studied medicine at the University of Cambridge and the Middlesex Hospital. After qualifying in 1944 he held a demonstratorship in pathology at the Middlesex and later became a junior assistant pathologist in the University of Cambridge. He took the M.R.C.P. in 1949 and at present is lecturer in pathology in the University of Leeds. His published work includes papers on gargoylism and idiopathic hypercalcæmia in infants.

The title of reader in physiology in the University of London has been conferred on Dr. R. D. Harkness, in respect of his post at University College.

### University of Birmingham

Dr. J. F. Soothill has been appointed lecturer in experimental pathology (metabolic diseases), and Dr. A. D. Harris research fellow in psychology and Dr. J. L. Crammer research fellow in neurochemistry, both in the department of experimental psychiatry.

### University of Liverpool

On Tuesday, Jan. 22, Dr. Rolf Luft, of the University of Stockholm, will give the James Arthur Smith lecture, on hypophysectomy in the treatment of malignant disease; on Tuesday, Jan. 29, Prof. Wilder Penfield, O.M., F.R.S., director of the Neurological Institute, McGill University, Montreal, will give the Sherrington lecture, on the cerebral cortex of man; on Tuesday, Feb. 26, Prof. L. J. Witts will give the Gwladys and Olwen Williams lecture, on leukæmia. All the lectures will be held at 5.15 P.M.

### University of Edinburgh

Mr. I. S. Kirkland has been appointed assistant director of the Edinburgh Postgraduate Board for Medicine and Dr. F. Albert-Recht lecturer in clinical chemistry.

### University of Leeds

Dr. C. K. Anderson has been appointed lecturer in urological pathology in the department of pathology.

### Institute of Almoners

The annual general meeting of this institute will be held on Saturday, Dec. 8, at 3 P.M. at the Conway Hall, Red Lion Square, London, W.C.1.

### Institute of Dermatology, London

A semi-permanent exhibition by Dr. P. D. Samman, on cutaneous tuberculosis and sarcoidosis, will be open from Dec. 1 to 24.

### University College Hospital, London

The next clinical demonstration for general practitioners at this hospital will be held at 10.15 A.M. on Sunday, Dec. 2, when the subject will be ear, nose, and throat problems in general practice.

### Royal College of Obstetricians and Gynæcologists

At a meeting of the council held on Nov. 24, with Mr. Charles Read, the president, in the chair, Dr. Edward White of Melbourne was appointed to give the William Meredith Fletcher Shaw lecture for 1957. The William Blair-Bell lecture for 1957 was awarded to Claude Taylor.

The Green-Armytage short-term travelling scholarship for 1957 was awarded to C. A. Simmons, and the prize for an essay on forceps delivery to J. Mann. J. Naylor Hunt and F. A. Murray (jointly) and N. F. Morris were appointed Leverhulme research scholars for 1957, and D. Methuen and G. P. Charlewood Bernhard Baron travelling scholars.

Wunnava Saroja Ramarao was admitted to the membership.

The diploma in obstetrics was awarded to the following:

R. J. W. Adamson, P. G. Allen, Anne Allison, D. F. A. Aubin, J. D. Avison, N. M. Bailey, J. G. Ball, Irene L. Barbour, Elizabeth S. M. Barnes, Margaret A. Barrie, Geoffrey Baum, N. L. Beisley, J. A. Benbow, Geoffrey Bennett, D. B. Beveridge, Vijaya Popatlal Bhoopatkar, G. A. C. Binnie, Jane I. K. Binnie, P. B. Biddell, J. S. Birch, E. S. Blackadder, Suzanne B. Blackburn, G. D. Blackledge, K. G. Bland, P. O. Bodley, A. P. Bolt, J. J. Bowen, K. W. Brewster, Isabel K. E. Brister, B. J. Brooks, P. H. Browne, Gillian M. Bryant, D. C. L'Estrange Burges, John Burgess, Patricia Burne, Helen M. Caldwell, W. H. Callander, W. M. Campbell, G. R. C. Campion, J. D. Campling, L. M. Carter, J. B. Chapman, Aileen P. Cherry, D. R. Childs, K. A. Clare, Margaret A. Clark, R. W. H. Clarke, R. C. Cochrane, R. W. Coffee, Sydney Cohen, J. B. Cole, A. G. Collington, Peter Cook, Wendy A. Cook, R. B. Conyngham, J. C. Cornwell, Patricia J. M. Cotter, I. D. S. Cowie, P. S. V. Cox, Rehemat Mohamedhusein Curmally, P. B. Curtis, Kathleen E. Coulter, K. J. Dalgliesh, Christine M. Davidson, M. J. A. Davies, R. G. Davies, J. L. Davis, W. G. Dawson, G. T. Day, K. G. Dickinson, J. H. Dickson, J. M. H. Dickson, J. R. Duke, P. G. Dunbar, William Dunn, R. A. Eames, A. J. Edwards, J. D'Arcy Edwards, J. R. Edwards, Marian S. Edwards, J. J. Eisenberg, Carice Ellison, A. J. Entwistle, Maureen Etchells, B. H. W. Finlaison, Freda W. Fleming, Phyllis M. Fleury, J. R. Flury, F. D. C. Ford, P. H. Foote, D. B. Fowler, R. N. Galloway, Frances E. Garrad, M. C. Guard, Grace M. Gee, Bridget M. Gell, Janet Goodall, Joan T. Graham, M. A. H. Graham, J. M. S. Grieve, I. M. Guiver, Mureen E. Hall, Guy Harris, Kathleen M. Harrison, Margaret A. Hatton, Alan Haworth, R. W. Henderson, P. J. G. Henry, R. S. T. Hey, Rosemary A. Hill, Doreen E. Hillier, G. H. Hilton, K. I. M. Hogg, B. W. Holbrook, J. B. Holland, G. M. R. Holliday, Streamlet Hooroo, Verna P. Houghton, A. J. G. Howse, Mary Howson, Elizabeth A. Hudson, John Hughes, Barry Ingham, Uriah Jacobson, B. F. Jamison, J. W. Jenkins, J. M. Jones, D. H. Jones, P. M. N. Jones, Khorshed Sorabji Karaï, W. G. Kilpatrick, A. K. Knowles, A. H. Labrum, B. W. Laithwaite, Vincent Leach, Gillian A. Lomax, G. E. Lovatt, I. V. Longfield, Eileen M. Maccoll, Duncan MacGregor, Angus Mackay, E. J. B. McArthur, P. D. P. McGrath, A. G. W. McLeod, L. A. McMichael, R. B. Macpherson, Santosh Madan, F. M. Mansfield, Annabel J. M. Mason, D. T. Mathews, D. H. Mathias, M. K. Mead, H. A. H. Melville, Anne D. Micah, T. W. P. Millar, J. H. Mitchell, P. J. Mitchell, Wendy L. Mitchener, Rafiqa Ghulam Mohammad, P. C. Moore, J. M. Morfitt, J. T. F. Morrall, J. C. Muir, I. C. Murison, C. W. A. Murray, A. G. Muttuthamby, Margaret Nathaniel, J. H. Naysmith, D. A. J. Neden, M. R. Newell, Wendy E. Noble, F. B. O'Connor, C. B. Officer, D. B. R. Osborne, W. J. H. Paradice, Jyoti Anilkumar Parikh, F. B. W. Parker, R. H. O. Parker, Kantilal Laxmichand Parmar, J. D. Parry, Muriel Parsons, U. N. Pathak, P. R. B. Pedlow, Marguerite E. Pennefather, Ugo Neil Phillips, J. F. Pritchard, J. R. Raby, M. B. Raby, M. M. Rana, J. N. Res, R. C. Richards, T. M. Richards, Nathaniel Rifkind, Andrew Robertson, I. H. Robinson, Margaret R. Robinson, Robert B. S. Ross, T. J. F. Rockey, M. J. Samuels, M. B. Scott, Madhukanta Krishnalal Shah, Rita W. Shannon, J. L. H. Sharp, Ma Khin Si, D. W. Smith, R. W. Smith, D. G. Standing, Paul Steward, Angela M. Strahan, Rhona Stringer, J. L. V. Summerhayes, Hilary K. C. Swash, G. W. Tamlyn, C. M. Taylor, R. C. Taylor, Thomas Taylor, Sarosh Meher Thanevala, Glenna Thomas, L. E. Thomas, Frances Celia Thomson, A. D. Thurz, Elizabeth M. Tilsen, R. S. Todd, E. J. Turner, John Turpin, Mary M. Tyndall, A. S. Valentine, G. R. Vesey, Jean M. Walinck, O. H. Watkins, Colin Watson, M. B. Watts, T. A. Weerasuriya, P. G. Wells, F. L. Whalley, P. H. Wiesendanger, Margaret M. Wilcox, Barbara M. Williams, Hilary P. Williams, J. P. M. Williams, D. W. Williamson, J. H. P. Willis, R. G. B. Willis, P. K. Wilson, Sheila A. Wood, Mary B. Woodfield, D. P. Woods, D. B. Wooldridge, G. H. Worsley, Ian Wort, H. W. Wright, Joan L. Young, S. S. Young, G. W. G. Yule.

### Royal College of Physicians of London

Dr. Terence East will deliver the FitzPatrick lectures on Tuesday and Thursday, Dec. 11 and 13, at 5 P.M. at the college, Pall Mall East, S.W.1. He is to speak on the history of cardiology.

### International Congress of Photobiology

The second International Congress on Photobiology is to be held in Turin from June 2 to 8. Further particulars may be had from Prof. Giuseppe Matli, the secretary-general, Istituto di Fisica dell'Università di Torino, Via Pietro Giuria 1, Corso Massimo d'Azeglio 46, Turin, Italy.

### Rockefeller Foundation

During the third quarter of 1956 the Foundation has distributed in grants over $2 million, of which $222,000 went to medical education and public health, and $657,000 to biological and medical research.

The grants to biochemical research include £30,000, over five years, for research at the University of Cambridge chemical laboratory, under Sir Alexander Todd, F.R.S., on the connection between nucleotides and protein synthesis, and to the development of more highly refined techniques for the preparation of polyphosphates which may make coenzymes more readily available for biological investigation. A grant of £8000 and $20,000 is to go to the University of Oxford in continued support of the Dyson Perrins Laboratory where Prof. E. R. H. Jones, F.R.S., is studying the chemistry of triterpenes and polyacetylenes and of the steroids. Another grant of £8000 goes to London Hospital Medical College to help the investigations of Prof. F. L. Warren, D.SC., and Dr. H. Harris into human biochemical genetics.

## Diary of the Week

DEC. 2 TO 8

### Monday, 3rd

INSTITUTE OF CHILD HEALTH
5 P.M. (Hospital for Sick Children, Great Ormond Street, W.C.1.) Prof. John Caffey (New York): Some X-ray and Clinical Features of Normal Infantile Hips—Their Significance in Diagnosis of Predislocation of the Hips.

### Tuesday, 4th

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
8.30 P.M. *Orthopædics.* Professor Caffey: Infantile Cortical Hyperostosis.
ST. MARY'S HOSPITAL MEDICAL SCHOOL, Paddington, W.2
5 P.M. Mr. D. J. MacRae: Pregnancy and Labour Complicated by Heart-disease.
INSTITUTE OF DERMATOLOGY, Lisle Street, W.C.2
5.30 P.M. Dr. R. H. Meara: Atopy.
INSTITUTE OF DISEASES OF THE CHEST, Brompton, S.W.3
2.30 P.M. Dr. Neville Oswald, Dr. J. G. Scadding, Dr. J. R. May, Dr. John Fry: Acute Respiratory Infections.
ROYAL STATISTICAL SOCIETY
5.30 P.M. (Westminster Medical School, Horseferry Road, S.W.1.) *Medical Section.* Dr. Harold F. Dorn: Medical Statistics at the National Institute of Health, U.S.A.
ROYAL ARMY MEDICAL COLLEGE, Millbank, S.W.1
5 P.M. Dr. Francis Camps: Forensic Medicine—Routine and Research.

### Wednesday, 5th

ROYAL SOCIETY OF MEDICINE
5.15 P.M. *History of Medicine.* Dr. Cuthbert Dukes: History of St. Peter's Hospital; Mr. A. R. C. Higham: History of St. Paul's Hospital, Endell Street.
8 P.M. *Surgery.* Prof. F. Linder (Berlin), Dr. R. A. Shooter: Problem of the Resistant Organism and Chemotherapeutic Sensitivity in Surgery.
KING'S COLLEGE HOSPITAL MEDICAL SCHOOL, Denmark Hill, Camberwell, S.E.5
4.30 P.M. Dr. Hans F. Bettinger (Melbourne): Multiple Malignant Tumours in Patients Suffering from Genital Carcinoma.
POSTGRADUATE MEDICAL SCHOOL OF LONDON, Ducane Road, W.12
2 P.M. Prof. W. S. Peart: Biochemistry of Hypertension.
ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE, 28, Portland Place, W.1
3.30 P.M. Dr. H. D. Chalke: Contribution of the Social Worker to the Community.
INSTITUTE OF DERMATOLOGY
5.30 P.M. Dr. C. D. Calnan: Epidermal Sensitisation.
INSTITUTE OF DISEASES OF THE CHEST
5 P.M. Dr. A. I. G. McLaughlin: Pneumoconiosis in Foundry Workers.
UNIVERSITY OF OXFORD
5 P.M. (Radcliffe Infirmary.) Mr. Terence Millin: Surgery of the Prostate. (Litchfield lecture.)
MIDLAND MEDICAL SOCIETY
8.15 P.M. (Birmingham Medical Institute, 154, Great Charles Street, Birmingham, 3.) Mr. Rodney Smith, Dr. J. J. Stevenson, Mr. W. P. Greening: Contribution of Radiology to the Study of Function.
MANCHESTER MEDICAL SOCIETY
4.30 P.M. (Medical School.) *Medicine.* Mr. Gordon Jack: Dysphagia.
MEDICO-CHIRURGICAL SOCIETY OF EDINBURGH
8.30 P.M. (Royal College of Surgeons, 18, Nicolson Street.) Dr. J. J. R. Duthie: Changing Concepts in the Field of Rheumatism.

### Thursday, 6th

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fields, W.C.2
5.30 P.M. Mr. E. J. Radley-Smith: Physiology of the Pituitary Gland.
UNIVERSITY OF LONDON
5 P.M. (University College Hospital Medical School, University Street, W.C.1.) Dr. Bettinger: Genetic, Hormonal, and Practical Aspects of Intersexuality.
ROYAL SOCIETY OF MEDICINE
5 P.M. *United Services.* Wing-Commander J. Malcolm: Systemic Arterial Resonance—a New Theory of the Circulation.
8 P.M. *Neurology.* Dr. J. MacDonald Holmes, Dr. R. A. Henson, Mr. M. J. Small: Early Management of Subarachnoid Hæmorrhage.
POSTGRADUATE MEDICAL SCHOOL OF LONDON
4 P.M. Dr. J. F. Goodwin: Cyanotic Heart-disease.
CHADWICK LECTURE
5 P.M. (Wright-Fleming Institute, St. Mary's Hospital, W.2.) Dr. J. N. Morris: Clinical and Community Medicine. (Malcolm Morris lecture.)
LIVERPOOL MEDICAL INSTITUTION, 114, Mount Pleasant, Liverpool, 3
8 P.M. Mr. H. Morriston Davies, Mr. J. Cosbie Ross, Dr. Jonathan Dobson: Treatment of Tuberculosis.
HONYMAN GILLESPIE LECTURE
5 P.M. (University New Buildings, Teviot Place, Edinburgh.) Prof. G. F. Marrian, F.R.S.: Biochemistry of the Œstrogenic Hormones.
UNIVERSITY OF ST. ANDREWS, Queen's College, Small's Wynd, Dundee
5 P.M. Prof. Ian Aird: Relationship Between the Blood-groups and Disease.

### Friday, 7th

ROYAL SOCIETY OF MEDICINE
10.30 A.M. *Otology.* Dr. J. D. Hood, Prof. William Burns, Mr. D. E. Broadbent, Dr. H. F. Schuknecht (Detroit): Noise and its Effects.
2.30 P.M. *Laryngology.* Mr. F. C. W. Capps: Benign Tumours of the Larynx.
5.30 P.M. *Anæsthetics.* Dr. Ole Secher (Copenhagen): Anæsthetic Problems in Cardiac Surgery.
POSTGRADUATE MEDICAL SCHOOL OF LONDON
10 A.M. Prof. A. G. R. Lowdon: Surgery of the Spleen.
INSTITUTE OF LARYNGOLOGY AND OTOLOGY, 330, Gray's Inn Road, W.C.1
3.30 P.M. Mr. Charles Heanley: Plastic Surgery of the Nose and Face.
ROYAL MEDICO-CHIRURGICAL SOCIETY OF GLASGOW
8.30 P.M. (Royal Faculty of Physicians and Surgeons of Glasgow.) Dr. T. F. Fox: Medicine in Soviet Russia.
UNIVERSITY OF DUBLIN
4.30 P.M. (School of Physic, Trinity College.) Dr. Donald Hunter: Present Need of a Sense of Historical Perspective. (Frederick Price lecture.)

### Saturday, 8th

INSTITUTE OF LARYNGOLOGY AND OTOLOGY
11.30 A.M. Dr. Harold F. Schuknecht: Surgical Management of Cancer of the Jaws.

## Appointments

ANDERSON, G. F., M.B. Edin., D.P.H.: senior assistant M.O., Norfolk.
HADFIELD, ESME, B.M. Oxfd, F.R.C.S.: consultant E.N.T. surgeon, High Wycombe and Amersham.
HOPEWELL, J. D., M.D. Sheff.: consultant pathologist, based on Scunthorpe and District War Memorial Hospital.
LAWY, H. S., M.D. Baghdad, L.M.S.S.A., DIP. BACT.: consultant pathologist based on Grimsby General Hospital.
MARTIN, R. W., L.R.C.P.S.I., D.P.H.: senior assistant M.O., Hove, school M.O., East Sussex.
SUMMERS, H. A. H., M.B. Belf., D.P.H.: M.O.H., Wednesbury.
THOMAS, W. D. C., M.B. Wales, D.P.M.: consultant psychiatrist, Pen-y-Val Hospital and Maincliffe Court early-treatment unit, Abergavenny.

**South-Western Regional Hospital Board:**
FRANKLIN, R. T. D., M.B. Leeds, D. P. M.: assistant psychiatrist, Digby-Wonford Hospital, Exeter.
STONEMAN, M. E. R., M.B. Manc., D.C.H.: registrar in pædiatrics, Royal Devon and Exeter Hospital, Exeter.
YOUSSEF, M. K. A., M.B. Cairo: orthopædic registrar, Winford Orthopædic Hospital and United Bristol Hospitals.

**Colonial Appointments:**
BOWLER, D. P., M.D. Lond., M.R.C.P., D.T.M. & H.: specialist officer (grade B) pædiatrician, Penang, Federation of Malaya.
CHERRY, J. K. T., M.D. Glasg., D.P.H.: senior M.O., Uganda.
COOPER, P. R., B.M. Oxfd: D.D.M.S., Western Nigeria.
CUMMINS, GERALDINE E. L., M.B. Camb., M.R.C.P.: chest physician, (specialist) Singapore.
DA COSTA, A. B., M.B. Edin.: M.O. (grade A) physician, Trinidad.
DIAL, I., M.B. Edin.: M.O. (grade B), Trinidad.
EROKWU, E. C., M.R.C.S.: senior M.O., Eastern Nigeria.
HARBEN, E. F., M.B. Madras: senior M.O., Gambia.
HEISCH, R. B., M.B. Camb.: senior specialist, Kenya.
KING, C. O., M.B.: M.O. (grade B), Trinidad.
LAMPART, R. G. F., M.B. Sheff., M.P.H. Harvard: M.O.H., Jamaica.
LANCELEY, J. L., M.D. Lpool, D.T.M. & H.: senior M.O., Uganda
LEVY, F. N. C., L.A.H., M.P.H. Harvard: M.O.H., Jamaica.
MANSON-BAHR, P. E. C., M.D. Camb., M.R.C.P.: senior specialist, Kenya.
MURPHY, G. G., M.B. N.U.I.: senior M.O. of health education, Uganda.
PEAT, A. A., M.B. Aberd., M.P.H. Harvard: chief M.O., Jamaica.
PHILLIPS, J. J., M.B. Leeds: senior M.O., Eastern Nigeria.
RUSSELL, A. R. L., M.B., M.P.H. Harvard: M.O.H., Jamaica.
TONER, JAMES, M.B. N.U.I.: senior M.O., Eastern Nigeria.
ZAHRA, ALBERT, M.D. Malta, D.T.M. & H., D.P.H.: specialist epidemiologist, Eastern Nigeria.

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*The Terms and Conditions of Service of Hospital Medical and Dental Staff apply to all N.H.S. hospital posts we advertise, unless otherwise stated. Canvassing disqualifies, but candidates may normally visit the hospital by appointment.*

## Academic and Educational

### ROYAL COLLEGE OF PHYSICIANS OF LONDON

CHARLES FREDERICK TERENCE EAST, Esq., D.M., F.R.C.P., will deliver the FITZPATRICK LECTURES on TUESDAY, 11TH DECEMBER, and THURSDAY, 13TH DECEMBER, 1956, at 5 P.M. at the College, Pall Mall East, S.W.1.

Subject : "Some Aspects of the History of Cardiology :
1. Diagnosis.
2. The Coronary Circulation."

Any member of the Medical Profession admitted on presentation of card.

By order of the President.
HAROLD BOLDERO, Registrar.

### ROYAL COLLEGE OF SURGEONS OF ENGLAND

FACULTY OF ANÆSTHETISTS

2-WEEK FULL-TIME COURSE IN ANÆSTHETICS
1ST–12TH APRIL, 1957
17TH–28TH APRIL, 1957.
14TH–25TH OCTOBER, 1957.

Applications are invited from medical practitioners with teaching experience who are holders of the F.F.A.R.C.S. for Tutorships in the above courses taking place at the Royal College of Surgeons during 1957. Tutorial Discussion Groups will be held for 1 hour each evening, and the honorarium will be 50 guineas for 10 classes.

Please apply not later than 17th December, 1956, to Mr. W. F. DAVIS, Secretary, Faculty of Anæsthetists, Royal College of Surgeons, Lincoln's Inn-fields, W.C.2.

### UNIVERSITY OF LONDON

A LECTURE on "Genetic, Hormonal and Practical Aspects of Intersexuality" will be given by Dr. H. F. BETTINGER (Melbourne) at 5 P.M. on 6TH DECEMBER at University College Hospital Medical School, University-street, W.C.1.

Admission free, without ticket.

JAMES HENDERSON, Academic Registrar.

### UNIVERSITY OF OTAGO AND MEDICAL RESEARCH COUNCIL OF NEW ZEALAND

CARDIOVASCULAR RESEARCH

Applications are invited from medical practitioners for the posts of :—

(*a*) SENIOR RESEARCH OFFICER
(*b*) MEDICAL RESEARCH OFFICER

to join a team working on the pathogenesis and treatment of high blood pressure and other circulatory problems. The successful applicants will be attached to the Department of Medicine, Otago University, New Zealand, and will have the opportunity of seeing patients in the Dunedin Hospital and will work in the Cardiovascular and Hypertensive Outpatients Departments. The clinical and experimental facilities are adequate and further details of the posts can be obtained from the undersigned or from the Secretary, Association of Universities of the British Commonwealth, 36, Gordon-square, London, W.C.1.

The salary for (*a*) Senior Research Officer is now £1600 p.a. rising to £1900 p.a. at which point there is a promotion bar. The salary for (*b*) Medical Research Officer is £875 p.a. rising to £1500 p.a. at which point salary increases depend upon promotion to rank of Senior Research Officer. The initial salary depends on the qualifications and experience of the applicant.

Applicants should state their age, nationality, qualifications, publications and academic and clinical experience, and a photograph should be sent. The names of 2 referees should be given. Applications should be sent by air-mail to Prof. F. H. SMIRK, Chairman of the Clinical Research Committee, Medical School, Dunedin, New Zealand.

### BEIT MEMORIAL FELLOWSHIPS FOR MEDICAL RESEARCH

Notice is hereby given that an election of Junior Fellows to begin work on 1ST OCTOBER next will take place in May, 1957. Junior Fellowships have successive annual values of £800, £850 and £900 for 3 years. As a rule, superannuation benefits are provided, to which the successful candidates will be required to contribute 5% of the annual stipend and to which the Trust will make a contribution of 10%. Candidates must have taken a degree in a faculty of a university approved by the Trustees in Her Majesty's Dominions, Protectorates and Mandated Territories, India, Pakistan and the Republic of Ireland, or a medical diploma registrable in the United Kingdom. Elections to Junior Fellowships are rarely made above the age of 35 years.

Applications from candidates must be received not later than 1st April. Candidates must submit evidence that they can be given accommodation in the departments where they propose to work, which must be either in Great Britain or Ireland. Forms of application and all information may be obtained by letter only, addressed to the Secretary, Beit Memorial Fellowships for Medical Research, the Lister Institute, Chelsea Bridge-road, London, S.W.1. For Overseas Candidates forms of application may be obtained from the Secretary, South African Medical Council, P.O. Box 205, Pretoria, South Africa ; The Director, Commonwealth Office of Education, Box 3879, Sydney, Australia ; the Department of Health, Wellington, New Zealand ; and the Canadian Medical Association, 244, St. George-street, Toronto, Canada.

### THE HEBERDEN SOCIETY

On FRIDAY, 14TH DECEMBER, 1956, at 5 P.M. Prof. R. E. TUNBRIDGE, O.B.E., M.D., M.SC., F.R.C.P., will deliver the HEBERDEN ORATION FOR 1956 at The Wellcome Building, Euston-road, London, entitled "The Connective Tissue System."

Members of the medical profession are cordially invited to attend.

### ROYAL COLLEGE OF SURGEONS OF ENGLAND.

A Full-time RESEARCH WORKER is required to assist in the investigation of the minute structure and development of nervous and other tissue, including densitometry and electron microscopy. Salary beginning at £900–£1000 according to age and experience. A medical or biological qualification and some research experience is essential. F.S.S.U. superannuation scheme in force.

Applications, with the names of 2 referees, should be sent by 19th December, 1956, to—

Prof. G. CAUSEY,
Department of Anatomy, Royal College of Surgeons.
Lincoln's Inn-fields, W.C.2.

**THE UNIVERSITY OF MANCHESTER.** Applications are invited for the full-time post of LECTURER IN NEUROSURGERY. Salary on a scale rising to £2000 p.a. according to qualifications and experience. Duties to commence as soon as possible. The successful applicant will be required to work in the Department of Neuro-surgery in the Manchester Royal Infirmary, and the Board of Governors of the United Manchester Hospitals may be prepared to negotiate an honorary contract (ungraded) with the person appointed.

Applications should be sent not later than 31st December, 1956, to the Registrar, the University, Manchester, 13, from whom further particulars and forms of application may be obtained.

**UNIVERSITY OF ST. ANDREWS. Eastern Regional HOSPITAL BOARD.** LECTURESHIP IN MIDWIFERY AND GYNÆCOLOGY. The University Court of the University of St. Andrews and the Eastern Regional Hospital Board invite applications for appointment as Lecturer in Midwifery and Gynæcology in Queen's College, Dundee, University of St. Andrews, from a date as soon as possible after 31st March, 1957. The salary attached to this appointment is £1700, rising by annual increments of £100 to £2200 p.a., together with F.S.S.U. benefits, and the person appointed will receive an honorary appointment from the Eastern Regional Hospital Board as Assistant Obstetrician and Gynæcologist in the Dundee Teaching Hospitals with the status of Consultant. The University of St. Andrews operates a scheme of family allowances, and a grant towards expenses of removal may be made.

Further particulars of the appointment may be obtained from the undersigned, with whom 14 copies of the application, containing the names of 3 referees, should be lodged not later than 15th January, 1957.

PATRICK CUMMING, Joint Clerk to the University Court.

**UNIVERSITY OF ST. ANDREWS. Queen's College, DUNDEE. DEPARTMENT OF MEDICINE AND DEPARTMENT OF PUBLIC HEALTH AND SOCIAL MEDICINE.** MEDICAL RESEARCH ASSISTANT required for 1 year for investigation into re-employment and other medical and social problems of patients after discharge from hospital. Possession of M.R.C.P. or other post-graduate qualification and/or previous experience of assessing disabilities will be an advantage. The investigation will be undertaken among patients in the medical wards of Prof. I. G. W. Hill. Assistance by a social worker and all facilities of the Department of Public Health and Social Medicine, including mechanical punched card equipment, will be available. The appointment will be made under an award from the Nuffield Provincial Hospitals Trust on terms approximately similar to those of a Registrar under the National Health Service.

Further details may be obtained from Prof. ALEXANDER MAIR, Queen's College, and all applications should reach the Joint Clerk to the University Court, Queen's College, Dundee, by 31st December, 1956.

**QUEEN'S UNIVERSITY OF BELFAST.** The Senate of the University invites applications for the CHAIR OF THERAPEUTICS AND PHARMACOLOGY from 1st April, 1957. Remuneration not less than £3100 with provisions for superannuation.

Applications should be submitted by 20th December, 1956. Further particulars may be obtained from G. R. COWIE, M.A., LL.B., Secretary.

## Hospital Services : Senior Appointments

**NORTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD.**

Maximum Part-time CONSULTANT RADIOLOGIST to Tottenham Group of hospitals, based on St. Ann's General Hospital, N.15. Person appointed to live within easy reach of Hospital.

Part-time CONSULTANT ORTHOPÆDIC SURGEON for 7 sessions a week to Southend-on-Sea Group of hospitals. Residence in Group Area is a condition of appointment.

Full-time ASSISTANT PSYCHIATRIST (Senior Hospital Medical Officer grade) at Claybury Hospital, Woodford Bridge, Essex.

Part-time CONSULTANT PHYSICIAN for 1 session a week to Mildmay Mission Hospital, E.2. Candidates must be in full sympathy with the evangelical aims of the Hospital.

Part-time CONSULTANT SURGEON to Metropolitan Hospital, E.8, for 2 sessions a week (Monday and Thursday afternoons). Post vacant on 17th March, 1957.

Part-time ASSISTANT OPHTHALMOLOGIST (Senior Hospital Medical Officer grade) for 3 sessions a week at Southbury Clinic, Glyn-road, Enfield.

Separate applications (6 copies), stating post concerned, and names of 3 referees, should reach the Secretary, 11A, Portland-place, London, W.1, by Saturday, 15th December.

**CHELMSFORD, ESSEX. BROOMFIELD HOSPITAL.** Required experienced Locum Tenens SENIOR HOSPITAL MEDICAL OFFICER for long period, full residence or only when on duty. Unit has 330 Beds for the treatment of pulmonary tuberculosis in adults. Tuberculous and non-tuberculous thoracic surgery, chest clinic, and mass radiography.

Apply Physician-Superintendent.

**NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD.**

(1) CONSULTANT MORBID ANATOMIST (whole-time or maximum sessions), Area Laboratory based at King Edward VII Hospital, Windsor.

Applications before 31st December, 1956.

(2) Whole-time CONSULTANT in Infectious Diseases AND PHYSICIAN-SUPERINTENDENT, Coppetts Wood Hospital, Muswell Hill, N.10 (144 Beds). Successful applicant required to live very near the Hospital. Flat in Hospital available if desired. Duties may include periodical consultative visits to other Infectious Diseases Hospitals.

Applications before 2nd January, 1957.

(3) ASSISTANT PSYCHIATRIST (whole-time), Senior Hospital Medical Officer grade, St. Bernard's Hospital, Southall, Middlesex (2507 Beds).

Applications before 4th January, 1957.

Hospitals may be visited by direct appointment.

Application forms obtainable from, and returnable to, Secretary, North West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1.

**BRIGHTON. ROYAL SUSSEX COUNTY HOSPITAL.** BRIGHTON AND LEWES HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for a Full-time or Part-time Locum RADIOTHERAPIST (Consultant, Senior Registrar or Registrar) at the above Hospital for a period of about 6 months beginning 1st December, 1956.

Further information can be obtained from the Group Secretary, Brighton and Lewes Hospital Management Committee, Royal Sussex County Hospital, Eastern-road, Brighton (Tel. No. Brighton 29155), to whom applications for the post should be sent immediately.

**LANCASTER MOOR HOSPITAL, Lancaster. (Regional** MENTAL HOSPITAL.) Locum ASSISTANT PSYCHIATRIST (Senior Hospital Medical Officer) required immediately for several weeks. Previous psychiatric experience essential. Salary according to national scale and at present 31½ guineas per week, less residential charges. Accommodation for single person only.

Apply Medical Superintendent.

**LEEDS REGIONAL HOSPITAL BOARD. Whole-time** Locum Tenens ANÆSTHETIST (Consultant or Senior Hospital Medical Officer grade) for duties at hospitals in the Halifax area. Person appointed to reside in Halifax.

Applications, stating age, qualifications and details of appointments held, showing dates, with the names and addresses of 3 referees, to the Secretary, Park-parade, Harrogate, as soon as possible.

**LEEDS REGIONAL HOSPITAL BOARD.**

Whole-time ASSISTANT PSYCHIATRIST (Senior Hospital Medical Officer grade) for duties at Broadgate Hospital, Beverley, and associated clinics at Beverley, Driffield, and Hull. Non-resident. Candidates must hold the D.P.M. or equivalent qualification.

Part-time CONSULTANT in Paediatrics (7 notional half-days per week) for duties mainly at hospitals in Hull. Additional duties at East Riding hospitals. Person appointed to reside in Hull. Post vacant on 1st May, 1957.

Part-time CONSULTANT in General Medicine (8 notional half-days per week). Duties mainly at Bradford Royal Infirmary (116 medical beds) and St. Luke's Hospital, Bradford (235 medical beds). Person appointed to reside in Bradford. Post vacant on 14th May, 1957.

Applications (12 copies), stating age, qualifications, and details of appointments held showing dates, with names and addresses of 3 referees, to the Secretary, Park-parade, Harrogate, by 19th December, 1956.

**MANCHESTER REGIONAL HOSPITAL BOARD. Whole-time** NON-RESIDENT ASSISTANT RADIOLOGIST (Senior Hospital Medical Officer) to the Stockport and Buxton and Macclesfield and District Hospital Centres, mainly at the Macclesfield General Hospital, Stockport Infirmary and Stepping Hill Hospital, Stockport. Wide experience, higher qualifications essential; appointee to work under general guidance of Consultants.

Application forms from the Senior Administrative Medical Officer to the Board, Cheetwood-road, Manchester, 8, to be returned by 21st December, 1956.

**MANCHESTER. UNITED MANCHESTER HOSPITALS.** MANCHESTER ROYAL EYE HOSPITAL. Applications are invited for the post of Part-time (9 sessions) SENIOR HOSPITAL MEDICAL OFFICER (non-resident). Previous experience in ophthalmology essential. The terms and conditions of service for hospital medical and dental staffs will apply.

Applications, giving details of past experience and qualifications, together with the names of 3 referees, to be addressed to the undersigned as early as possible. (Special application forms can be obtained on request.)

F. J. CABLE, Secretary, United Manchester Hospitals.

The Lodge, Oxford-road, Manchester, 13.

**OXFORD. THE UNITED OXFORD HOSPITALS AND** THE OXFORD REGIONAL HOSPITAL BOARD. Applications are invited for the post of Part-time CONSULTANT DERMATOLOGIST to the United Oxford Hospitals (6 sessions) and to the Oxford Regional Hospital Board (2 sessions at Banbury). This advertisement supersedes an advertisement for a part-time Consultant Dermatologist published in this journal on 1st September.

Applications (10 copies), stating age, qualifications and experience, should reach the undersigned, from whom further particulars can be obtained, not later than 15th December, 1956.

E. J. R. BURROUGH, Administrator.

Radcliffe Infirmary, Oxford.

Applications already received for the previous post will be taken as applications for this post unless the Administrator is informed to the contrary before the closing date of this advertisement.

**OXFORD REGIONAL HOSPITAL BOARD. Consultant** RADIOLOGIST (whole-time or maximum part-time) to the hospitals of the Kettering Northampton Area Department in Radiology. Duties mainly in the hospitals of the Kettering and District Hospital Management Committee, including Corby Diagnostic Centre, with some duties at Northampton General Hospital and the peripheral units. The successful candidate will be required to live in the Kettering area. Applicants must hold a recognised Diploma in Radiology and a higher qualification in medicine or surgery is desirable.

Applications, stating age, qualifications, experience, and the names of 3 referees, should reach the Secretary of the Board, 43, Banbury-road, Oxford, by 22nd December, 1956.

**OXFORD REGIONAL HOSPITAL BOARD. Whole-time** ASSISTANT PSYCHIATRIST (Senior Hospital Medical Officer) to the Pewsey Hospital (for mental defectives), Pewsey, Wilts, and its ancillary premises with psychiatric outpatient work in the Swindon area. Experience of work in a mental deficiency institution is essential and possession of a D.P.M. desirable. Married accommodation available. The Hospital may be visited by arrangement with the Secretary of the Hospital, from whom further details may be obtained.

Applications (10 copies), stating age, experience, qualifications, and names of 3 referees, to reach the Secretary, Regional Hospital Board, 43, Banbury-road, Oxford, by 31st December, 1956.

**NEWCASTLE REGIONAL HOSPITAL BOARD. Durham** AND NORTH WEST DURHAM HOSPITAL MANAGEMENT COMMITTEES. Locum CONSULTANT E.N.T. SURGEON required immediately.

Applications, with names and addresses of 3 referees, to Senior Administrative Medical Officer, Benfield-road, Newcastle upon Tyne, 6.

**SCOTLAND. SOUTH-EASTERN REGIONAL HOSPITAL BOARD.** Applications are invited from registered medical practitioners for the appointment of DEPUTY SENIOR ADMINISTRATIVE MEDICAL OFFICER to the above Board. The salary is on the scale £1850–£100 (5)–£2350 and the post is superannuable.

Applications, giving particulars of qualifications and experience, together with the names of 3 referees, should be sent to the Secretary, South-Eastern Regional Hospital Board, Scotland, 11, Drumsheugh-gardens, Edinburgh, by Monday, 17th December, 1956.

**SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD.** Applications are invited for the appointment of Whole-time CONSULTANT BACTERIOLOGIST based at Robroyston Hospital, Glasgow, for work within the laboratory sector of the Glasgow Northern Hospitals. This appointment is subject to the National Health Service (Scotland) superannuation regulations.

Applications (16 copies), stating date of birth, qualifications, experience, present appointment, and the names of 3 referees, to reach the Secretary, Western Regional Hospital Board, 64, West Regent-street, Glasgow, C.2, not later than 30 days after the publication of this advertisement.

**SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time** or maximum Part-time CONSULTANT PSYCHIATRIST required for duties in Grimsby and district.

Application forms and further details from Senior Administrative Medical Officer, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield. Forms to be returned by 22nd December, 1956.

**SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time** SENIOR ASSISTANT PSYCHIATRIST to be designated Deputy Medical Superintendent at Glenfrith Hospital, Leicester. A house is available. Salary £1575–£50–£2025.

Application forms and further details from Senior Administrative Medical Officer, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield. Forms to be returned by 22nd December, 1956.

**SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD** requires Whole-time ASSISTANT PSYCHIATRIST (Senior Hospital Medical Officer grade) at Coldharbour M.D. Hospital, Sherborne, Dorset, in the Coldeast and Tatchbury Mount Group. Candidates should have D.P.M. and experience in psychiatry and hospital administration. Successful candidate will take part in the work of the Group in general and will have opportunities of participating in other local psychiatric services. 7-roomed bungalow available on estate if desired. If non-resident, person appointed will be required to live near Hospital.

Applications by letter (5 copies), giving date of birth, qualifications, experience, and names of 3 referees, to Secretary (S.1), South West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, by 29th December, 1956. Applicants may visit Hospital by local arrangement.

**SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD** requires Whole-time CONSULTANT PSYCHIATRIST at St. Ebba's Hospital, Epsom, Surrey, which is principally concerned with the treatment of voluntary cases of good prognosis and has over 1200 admissions annually. Full facilities for psychological and physical investigations, and all modern treatments used. The Hospital has Outpatient Departments and a special unit for juvenile psychiatric cases. There are teaching linkages with a London training hospital and the appointment involves psychiatric teaching of Registrars. Candidates should possess D.P.M. and a higher medical qualification, and have wide experience in all branches of psychiatry, particularly physical methods of treatment and neuropharmacology.

Applications by letter (5 copies), giving date of birth, qualifications, experience, and names of 3 referees, to Secretary (S.1), South West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, by 29th December, 1956. Applicants may visit Hospital by local arrangement.

**SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD** requires Whole-time ASSISTANT PSYCHIATRIST (Senior Hospital Medical Officer grade) to take charge of the male division at the Manor, Epsom, Surrey—a hospital with specialised facilities for the socio-industrial habilitation of high-grade mental defectives, and which has excellent facilities for research. Candidates should have D.P.M. Accommodation for a single person.

Applications by letter (5 copies), giving date of birth, qualifications, experience, and names of 3 referees, to Secretary (S.1), South West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, by 29th December, 1956. Applicants may visit Hospital by local arrangement.

**SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD** requires Whole-time ASSISTANT PSYCHIATRIST (Senior Hospital Medical Officer grade) at Belmont Hospital, Sutton, Surrey, which is principally concerned with treatment of neuroses and early psychoses. There are ample opportunities for research and Hospital, recognised for D.P.M., takes active part in teaching in association with teaching hospitals. Candidates should possess D.P.M.

Applications by letter (5 copies), giving date of birth, qualifications, experience, and names of 3 referees, to Secretary (S.1), South West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, by 29th December, 1956. Applicants may visit the Hospital by local arrangement.

**AUSTRALIA. ALFRED HOSPITAL, Commercial-road, PRAHRAN, VICTORIA, AUSTRALIA.** Applications are invited from duly qualified medical practitioners and will be received by the undersigned until 31st December, 1956, for the appointment of SECOND ASSISTANT to Director of Anæsthesia. Applicants should have had at least 2 years experience in anæsthesia since graduation and should hold a senior qualification. Salary will be within the range of £1750 and £2250 p.a. on appointment according to qualifications and experience. Duties to commence early in 1957.

The Department of Anæsthesia and Resuscitation is responsible for arrangements for anæsthesia and resuscitation within Alfred Hospital which is a general teaching hospital of 430 public and 90 private beds. Postgraduate training in anæsthesia is also conducted. Further information may be obtained from the Director of Anæsthesia. C. G. RANKIN, Manager.

**IBADAN, NIGERIA. UNIVERSITY COLLEGE HOSPITAL.**

(*a*) SENIOR HOSPITAL MEDICAL OFFICER.
(*b*) 2 HOSPITAL MEDICAL OFFICERS (Junior Hospital Medical Officer).

The Board of Management invite applications from experienced medical practitioners for the above appointments as Hospital Medical Officers in the General Outpatient Department of the almost completed teaching hospital which, it is anticipated, will be functioning early in the New Year. In addition to duties in the General Outpatient Department the Hospital Medical Officers will be required to assist with the running of a staff Health Service.

The salaries offered for the posts are :—

(*a*) Senior Hospital Medical Officer : £1482 p.a. rising by 5 annual increments to £1788 p.a. plus an inducement allowance for expatriate officers of £300 p.a.

(*b*) Hospital Medical Officer : £1116 p.a. rising by 6 annual increments to £1428 p.a. plus an inducement allowance for expatriate officers of £270 p.a. rising to £300 when the salary exceeds £1284 p.a.

The appointment will be initially for 2 tours of from 12 to 18 months and will be renewable by mutual agreement. On satisfactory completion of the agreement a gratuity of £37 10s. will be paid for each completed period of 3 months service. An outfit allowance of £60 is payable on first appointment. Partly furnished quarters are provided at a rental of 8½% of salary, excluding inducement allowance. A Nigerian officer will be eligible for 5 days leave on full pay for each completed month of service in Nigeria and an expatriate officer will be eligible for 7 days for each completed month. Free first-class passages to and from Nigeria are provided for expatriate doctors and their wives on first appointment, vacation leave, and on completion of agreement. Free first-class passages to Nigeria will, in certain circumstances, be provided for non-expatriate doctors. Candidates will be eligible for children's allowances in accordance with existing regulations. Arrangements can be made to enable doctors to continue their National Health Service superannuation scheme contributions, and details of the revised salary and gratuity payable in such cases will accompany application forms.

Applications should be submitted not later than 14th December, 1956, on the appropriate forms, which will be forwarded, together with further information, on receipt of an addressed foolscap envelope, by the Adviser on Staff Recruitment, London Office, University College Hospital, Ibadan, 57, Catherine-place, London, S.W.1.

## Hospital Services : Junior Appointments

**CENTRAL MIDDLESEX HOSPITAL, Park Royal, N.W.10.** RESIDENT SENIOR HOUSE OFFICER required for Casualty Department. Successful candidate will work under supervision of Orthopædic and Traumatic Specialist. Appointment for 6 months from 18th December.

Applications, with names of 2 referees or copies of 2 testimonials, to Medical Director, by 8th December.

**CHARING CROSS HOSPITAL, W.C.2. Senior House** OFFICER in Pathology for 1 year in the first instance with eligibility for promotion to Registrar grade for 1 further year. During this 2-year period, approximately 1 year will be spent in residence in the Hospital.

Application forms obtainable from the undersigned to be returned by 15th December, 1956.

FRANK HART, Secretary to the Board.

**BATTERSEA GENERAL HOSPITAL, Battersea Park, S.W.11.** CASUALTY OFFICER (residence optional), House Officer or Senior House Officer grade according to experience. Vacant immediately. Not recognised for F.R.C.S.

Apply Hospital Secretary, enclosing copies of 2 recent testimonials.

**BROMPTON HOSPITAL, S.W.3. Applications invited** for the following posts :—

NON-RESIDENT SURGICAL OFFICER (post graded as Senior House Officer or Registrar, according to qualifications and experience), for which there are 2 vacancies, for 6 months from 1st February, 1957, with eligibility for reappointment. Candidates must have held a resident hospital appointment.

RESIDENT HOUSE PHYSICIAN (2 vacancies), 1 vacancy for 6 months from 1st February, 1957. Duties include work in Outpatient Department and wards. 1 vacancy for 9 months from 1st February, 1957. The first 3 months at Brompton Hospital Sanatorium, Frimley, and the following 6 months at the Hospital in London covering work in Outpatient Department and wards. Salary at the rate of £525 p.a.

Applications, stating age, qualifications with dates, nationality, and appointments held, together with copies of testimonials, by 8th December, 1956, to—

KENNETH A. F. MILES, House Governor.

**DULWICH HOSPITAL, East Dulwich-grove, S.E.22.** Applications invited for appointment as HOUSE SURGEON (general surgical duties). Post vacant 4th January, 1957. Recognised for pre-registration purposes. There is an association with Kings College Hospital medical school for teaching purposes.

Applications, giving age, qualifications and previous post (if any) with copy testimonials or names of 2 referees, to Group Secretary, Camberwell Hospital Management Committee, Dulwich Hospital, not later than 10th December.

**FULHAM HOSPITAL, St. Dunstan's-road, Hammersmith, W.6.** SENIOR HOUSE SURGEON to the Orthopædic Department. Post is recognised for the F.R.C.S. and provides ample opportunity for general or orthopædic accident experience with postgraduate teaching. Resident post, vacant 2nd January, 1957.

Applications by 14th December, 1956, on forms obtainable from the Hospital Secretary. (L.156.)

**GERMAN HOSPITAL, London, E.8. (General—157 Beds.)** Applications are invited for the 12 months appointment, vacant 4th January, of SENIOR HOUSE OFFICER (general surgery) and should reach the Group Secretary, Hackney Hospital, E.9, by 14th December, quoting GH/SHO.

**GERMAN HOSPITAL, Dalston, E.8. (General—157 Beds.)** Applications are invited for the 6-month appointment, from 25th December, of HOUSE PHYSICIAN (registered practitioners only) and should reach the Group Secretary, Hackney Hospital, London, E.9, by 7th December, quoting GH/HP.

**GERMAN HOSPITAL, London, E.8. (General—157 Beds.)** Applications are invited for the 6-months appointment, from 23rd January, of Pre-registration HOUSE PHYSICIAN, and should reach the Group Secretary, Hackney Hospital, E.9, by 14th December, quoting GH/PHP.

**HAMPSTEAD GENERAL HOSPITAL, Haverstock Hill, N.W.3.** (ROYAL FREE HOSPITAL GROUP.) Applications are invited from registered medical practitioners for the post of RESIDENT CASUALTY OFFICER (graded as Senior House Officer). Salary £745 p.a. Tenable for a period of 6 months from 1st January, 1957, at the Main Outpatients Department, Bayham-street, N.W.1.

Application forms may be obtained from the Secretary, to whom they should be returned together with copies of 3 recent testimonials, by 11th December, 1956.

**HAMPSTEAD GENERAL HOSPITAL, Haverstock Hill, N.W.3.** (ROYAL FREE HOSPITAL GROUP.) Applications are invited for the pre-registration post of NON-RESIDENT CASUALTY OFFICER (medical or surgical), vacant 1st January, 1957, tenable for a period of 6 months.

Application forms may be obtained from the Secretary, to whom they should be returned, together with copies of 3 recent testimonials, by 11th December, 1956.

**HIGHLANDS GENERAL HOSPITAL, Winchmore Hill, N.21.** CASUALTY OFFICER (Senior House Officer grade), resident.

Applications, with copies of 3 testimonials and name and address of 1 referee, to Hospital Secretary.

**HIGHLANDS GENERAL HOSPITAL, Winchmore Hill, London, N.21.** HOUSE SURGEON, vacant 18th December. 50 surgical beds, new operating theatre, Outpatient and Casualty Departments. Preference given to applicants seeking pre-registration post under Medical Act, 1950.

Applications, with copies of 3 testimonials and name and address of 1 referee, to Hospital Secretary.

**LONDON CHEST HOSPITAL. 2 vacancies occur 1st** February, 1957, for RESIDENT HOUSE PHYSICIAN. Appointment for 6 months, 4 in London, 2 at the Country Branch, near Letchworth, and post graded as House Officer. Duties include work in the Outpatient Department and Refill Clinic, as well as in wards.

Applications, stating date of birth, qualifications with dates, and previous appointments held, with copies of 3 testimonials, should reach the undersigned not later than 18th December, 1956.

THOMAS BROWN, House Governor.

London Chest Hospital, E.2.

**LAMBETH HOSPITAL, Kennington, S.E.11.** Applications are invited from pre-registration and registered medical practitioners for the position of RESIDENT HOUSE SURGEON in the Obstetric and Gynæcological Department. The appointment is for 6 months from 1st January, 1957. Post recognised for the M.R.C.O.G. and D.Obst.R.C.O.G.

Application forms from the Physician-Superintendent. Stamped addressed envelope should be enclosed.

**LAMBETH HOSPITAL, Kennington, S.E.11.** Applications are invited from pre-registration and registered medical practitioners for the position of RESIDENT HOUSE PHYSICIAN, vacant 1st January, 1957. The successful candidate will be required to carry out a fortnight's locum duty starting on 18th December, 1956.

Application forms from the Physician-Superintendent. A stamped addressed envelope should be enclosed.

**MEMORIAL HOSPITAL, Woolwich, S.E.18.** House SURGEONS. 2 posts vacant 1st January. Recognised for F.R.C.S. and approved for pre-registration purposes.

Apply to Secretary.

**MEMORIAL HOSPITAL, Shooters Hill Woolwich,** S.E.18. SENIOR HOUSE OFFICER (anæsthetics), vacant mid-December. Recognised for F.F.A.R.C.S. and D.A. 6 months resident appointment and may then be renewed.

Apply to Secretary.

**MILE END HOSPITAL, Bancroft-road, London, E.1.** (484 Beds.) HOUSE PHYSICIAN (pre- or post-registration). Post vacant 20th December, 1956.

Application forms, obtainable from Physician-Superintendent, should be returned by 7th December, 1956, with copies of not more than 3 testimonials.

**MOORFIELDS EYE HOSPITAL, City-road Branch,** London, E.C.1. Applications are invited for the post of SIXTH HOUSE SURGEON (Registrar), non-resident. The appointment is for a period of 4 months from 1st March, 1957, and the holder of the post at the completion of that time will be eligible for appointment as Fifth, Fourth, Third, Second Resident Surgical Officer and subsequently as Senior Resident Officer, for similar periods.

Applications should be submitted on the official form obtainable from the undersigned, stating age and qualifications, together with testimonials and photograph, and be received not later than 15th December, 1956.

A. J. M. TARRANT, House Governor.

**NATIONAL HOSPITALS FOR NERVOUS DISEASES.** Applications are invited from registered medical practitioners for the appointment of HOUSE PHYSICIAN at The National Hospital, Queen-square, W.C.1, commencing 17th December, 1956. This post carries the grade of Registrar. The appointment will be for 1 year and will be renewed in exceptional circumstances.

Applications, with names of 3 referees, to be sent to the undersigned not later than 4th December, 1956.

H. EWART MITCHELL,
Secretary to the Board of Governors.

The National Hospital, Queen-square, W.C.1.

**NORTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD.**

REGISTRAR in Pathology (resident, or non-resident near Hospital), Southend Group Laboratory, General Hospital, Rochford, Essex. Recognised for Diploma in Pathology.

PSYCHIATRIC REGISTRAR (non-resident), Whipps Cross and Langthorne Hospitals, Leytonstone, E.11.

REGISTRAR in Obstetrics and Gynæcology (resident), St. Andrew's Hospital, Devons-road, E.3.

SURGICAL REGISTRAR (resident), Tilbury and Riverside General Hospital, Tilbury, Essex. Recognised for F.R.C.S. 74 acute surgical beds and active Outpatient Department. Post offers excellent training in general surgery, E.N.T., and gynæcology.

REGISTRAR in General Surgery and Gynæcology (resident or non-resident), St. Mary's Hospital, Plaistow, E.13.

SURGICAL REGISTRAR (resident), Queen Mary's Hospital for the East End, Stratford, E.15.

REGISTRAR in Diseases of the Chest (resident), Rochford General Hospital and Lancaster House Chest Clinic, Southend-on-Sea, Essex. Duties in active Chest Unit, 72 Beds at Rochford Hospital and wide range of clinical duties at Lancaster House Clinic. Experience in general medicine essential.

REGISTRAR in Diseases of the Chest (resident), Broomfield Hospital, near Chelmsford, Essex. Modern Hospital, 312 Beds. Tuberculous and non-tuberculous surgery, chest clinics and mass radiography. Successful candidate required mainly for general ward and relief duties and to assist in operating theatre. Opportunities for study.

Appointments subject to review after 1 year.

Application forms from Secretary, 11A, Portland-place, W.1, to be returned by 15th December, 1956.

**PRINCE OF WALES'S GENERAL HOSPITAL, N.15.** Applications are invited from registered medical practitioners for the appointment of SENIOR HOUSE OFFICER RESIDENT SENIOR CASUALTY OFFICER, recognised for F.R.C.S. examinations, to the above Hospital for a period of 6 months, vacant 15th January, 1957.

Application form from Secretary, The Tottenham Group Hospital Management Committee, The Green, N.15, to be returned by 15th December, 1956.

**QUEEN ELIZABETH HOSPITAL FOR CHILDREN** MANAGEMENT COMMITTEE, Hackney-road, E.2, Shadwell, E.1, and BANSTEAD WOOD, SURREY. 2 HOUSE OFFICERS. 1 of these appointments will be made for 2 periods of 6 months, commencing 1st February, 1957, and 1st September, 1957. First period as House Physician and second as House Surgeon and Casualty Officer. The other will be for 6 months only as House Physician from 1st February, 1957.

Application forms, from the Secretary at Hackney-road, should be returned with copies of not more than 3 testimonials on or before 10th December, 1956.

**ST. JAMES' HOSPITAL, Balham, S.W.12. Part-time** CLINICAL ASSISTANT (E.N.T.) required for 2 sessions per week (Monday morning and Thursday afternoon). Salary £175 p.a. per session.

Applications in writing, stating age, qualifications, experience, and names of 2 referees, to Group Secretary at above address by 12th December. (0103.)

**ROYAL NORTHERN HOSPITAL, Holloway, N.7. Senior** HOUSE OFFICER (gynæcology) required. Appointment is for 6 months in the first instance pending reorganisation of duties.

Applications, with copies of recent testimonials, to be sent to the Hospital Secretary by 11th December, 1956.

**ROYAL MASONIC HOSPITAL, Ravenscourt Park,** London, W.6. Applications are invited for the post of RESIDENT SURGICAL REGISTRAR: appointment about 1st January, 1957. Gross salary—first year £850 (residential emoluments of £130 deductible); second year £965 (residential emoluments of £145 deductible).

Please state age, qualifications, past and present appointments, and include 2 recent testimonials and/or the names of 2 referees. Applications should reach the undersigned (from whom further information may be obtained) as soon as possible, and in any event not later than 13th December, 1956.

R. E. LAWSON, Secretary and House Governor.

**ROYAL MASONIC HOSPITAL, Ravenscourt Park,** London, W.6. Applications are invited for the post of RESIDENT MEDICAL REGISTRAR: appointment about 1st February, 1957. Gross salary—first year £850 (residential emoluments of £130 deductible); second year £965 (residential emoluments of £145 deductible).

Please state age, qualifications, past and present appointments, and include 2 recent testimonials and/or the names of 2 referees. Applications should reach the undersigned (from whom further information may be obtained) as soon as possible, and in any event not later than 13th December, 1956.

R. E. LAWSON, Secretary and House Governor.

**SOUTH LODGE HOSPITAL, World's End-lane, N.21.** RESIDENT SENIOR HOUSE OFFICER required. Previous E.N.T. experience desirable. Post includes general surgical duties. Vacant 30th December, 1956.

Applications, with the names and addresses of 2 referees, to the Group Secretary, Enfield Group Hospital Management Committee, Chase Farm Hospital, The Ridgeway, Enfield, Middlesex.

**SOUTH LONDON HOSPITAL FOR WOMEN AND** CHILDREN, Clapham Common, S.W.4. Applications are invited from pre-registration and registered Female medical practitioners for the appointment of HOUSE SURGEON, vacant 22nd December, 1956, for a period of 6 months. Recognised for F.R.C.S.

Forms of application from the Secretary.

**SOUTH LONDON HOSPITAL FOR WOMEN AND** CHILDREN, Clapham Common, S.W.4. Applications are invited from pre-registration and registered Female medical practitioners for the appointment of GYNÆCOLOGICAL HOUSE SURGEON, vacant 20th December, 1956, for 6 months. Recognised for the M.R.C.O.G.

Application forms from the Secretary.

**ST. GILES' HOSPITAL, Camberwell, S.E.5.** Applications invited for appointment as HOUSE SURGEON (general surgical duties). Post vacant from 1st January, 1957; recognised for pre-registration purposes.

Applications, giving age, qualifications and previous posts (if any), to Group Secretary, Camberwell Hospital Management Committee, Dulwich Hospital, East Dulwich-grove, London, S.E.22.

**ST. LEONARD'S HOSPITAL, Nuttall-street, London,** N.1. Applications are invited from registered medical practitioners for the post of SENIOR HOUSE OFFICER in the Casualty Department, vacant 4th January, 1957. Recognised for F.R.C.S.

Apply, with 2 testimonials, to Hospital Secretary by 15th December, 1956.

**ST. NICHOLAS HOSPITAL, Plumstead, S.E.18. House** SURGEON (gynæcology and obstetrics), vacant 9th January. Recognised for D.Obst.R.C.O.G. or 3 months obstetrics, 3 months gynæcology for M.R.C.O.G.

Applications to Group Secretary, Memorial Hospital, Woolwich, S.E.18.

**ST. NICHOLAS HOSPITAL, Plumstead, S.E.18. House** SURGEONS. 2 posts vacant 1st January. Recognised for F.R.C.S. and approved for Pre-registration Service.

Apply to Group Secretary, Memorial Hospital, Woolwich, S.E.18.

**ST. NICHOLAS HOSPITAL, Plumstead, S.E.18. Senior** HOUSE OFFICER (anæsthetics), vacant mid-December. Recognised for F.F.A.R.C.S. and D.A. 6 months resident appointment and may then be renewed.

Apply to Group Secretary, Memorial Hospital, Woolwich, S.E.18.

**ST. OLAVE'S HOSPITAL, Lower-road, Rotherhithe,** S.E.16. BERMONDSEY AND SOUTHWARK HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the post of SENIOR HOUSE OFFICER, Casualty Department at above Hospital, which becomes vacant on 1st January, 1957. Resident or non-resident post, 9 A.M.–5 P.M. Salary £745 p.a. Post recognised for F.R.C.S., is tenable for 6 months and is renewable.

Applications, together with full details and names of 2 referees, to the Secretary at above address.

**ST. STEPHEN'S HOSPITAL, Chelsea, S.W.10. House** PHYSICIAN (resident), pre-registration. General medicine and some tuberculosis. Vacancy mid-December.

Applications, naming 2 referees, to Medical Superintendent.

**ST. STEPHEN'S HOSPITAL, Chelsea, S.W.10. Senior** HOUSE PHYSICIAN (Senior House Officer), general medicine. Some teaching. Immediate vacancy.

Applications, naming 2 referees, to Medical Superintendent.

**ST. THOMAS'S HOSPITAL, London, S.E.1. Junior** HOSPITAL MEDICAL OFFICER to the Department of Venereal Diseases, for a period of 1 year in the first instance, to carry out 8 half-day sessions per week.

Applications, naming 2 referees, to the Clerk of the Governors by 8th December, 1956.

**ST. PETER'S, ST. PAUL'S AND ST. PHILIP'S HOSPITALS.** RESIDENT SURGICAL OFFICER (Registrar grade) required for St. Philip's Hospital on 1st February, 1957. Appointment for 6 months with opportunity for extension. Work includes medical urology and opportunity for research.

Apply in writing (12 copies), and names of 2 referees, to the House Governor, St. Peter's Hospital, Henrietta-street, W.C.2. Closing date 31st December, 1956.

**THE HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London, W.C.1.** There will be a vacancy on 6th March, 1957, for an ASSISTANT RESIDENT MEDICAL OFFICER (grade—Senior House Officer) at the Country Branch Hospital, Tadworth, Surrey (101 Beds).

Further particulars and forms of application, which must be returned not later than Monday, 7th January, 1957, are obtainable from the undersigned.

H. F. RUTHERFORD, House Governor and Secretary.

**WANSTEAD HOSPITAL, Hermon Hill, London, E.11.** (191 Beds.) HOUSE SURGEON required. Post vacant 7th December, 1956. Recognised for F.R.C.S.

Applications, with full details and copies of 2 recent testimonials, should be sent immediately to Secretary, Forest Group Hospital Management Committee, Langthorne-road, E.11.

**WANSTEAD HOSPITAL, Hermon Hill, E.11. (191 Beds.)** Applications are invited for the post of OBSTETRIC AND GYNÆCOLOGICAL HOUSE SURGEON, vacant 7th January, 1957. The appointment is recognised for the D.Obst.R.C.O.G.

Applications, with full details and copies of 2 recent testimonials, should be sent immediately to Secretary, Forest Group Hospital Management Committee, Langthorne-road, E.11.

**WEST END HOSPITAL FOR NEUROLOGY AND** NEUROSURGERY, 91, Dean-street, W.1. Applications are invited for the post of SENIOR HOUSE PHYSICIAN (organic neurology) commencing 1st January, 1957.

Applications, stating age, qualifications and experience, together with the names and addresses of 2 referees, to be forwarded to Hospital Secretary by 6th December.

**WESTMINSTER HOSPITAL, St. John's Gardens, S.W.1.** Applications invited for vacant post of REGISTRAR to Radiotherapy Department for 1 year in the first instance. Preference given to candidates holding F.R.C.S. or M.R.C.P. Experience of general medicine or surgery in Registrar grade an advantage. Knowledge of radiotherapy not essential.

Applications (7 copies), with names of 2 referees, to House Governor by 15th December.

**WESTMINSTER HOSPITAL, St. John's Gardens, S.W.1.** Applications invited for vacant post of SENIOR HOUSE OFFICER to Radiotherapy Department for 1 year.

Applications (7 copies) with names of 2 referees, to House Governor by 15th December.

**WOOLWICH GROUP HOSPITAL MANAGEMENT COMMITTEE.** SENIOR HOUSE OFFICER (pathology), vacant 1st January. The appointment is to the Group laboratories and is for 1 year. Salary £745 p.a., less £150 p.a. if resident.

Apply to Group Secretary, Memorial Hospital, Woolwich, S.E.18.

**ABERDEEN GENERAL HOSPITALS BOARD OF** MANAGEMENT. Applications are invited for the post of SENIOR HOUSE OFFICER in Geriatrics at Glenburn Wing, Woodend General Hospital, Aberdeen. The post is non-resident.

Applications, giving details of qualifications and experience, with the names of 2 referees, should be lodged with the Secretary, Aberdeen General Hospitals, P.O. Box 92, 62, Queen's-road, Aberdeen, within 14 days of the appearance of this advertisement.

**ABERDEEN. KINGSEAT MENTAL HOSPITAL, New-**MACHAR, ABERDEEN. Applications are invited from Male and Female doctors for posts as SENIOR HOUSE OFFICERS in the above modern Mental Hospital of 810 Beds. Residential accommodation is available. The Hospital is recognised for study for the D.P.M. and there is close association with the University Department of Mental Health. Posts would be tenable for 1 year in the first instance. National Health Service conditions apply. Applications for Locum Tenens posts will be considered.

Applications, with age, details of experience, &c., and the names of 2 referees, should be lodged with the Secretary, Aberdeen Mental Hospitals, 62, Queen's-road, Aberdeen, within 14 days of this advertisement.

**ASHFORD HOSPITAL, Ashford, Middlesex. (560 Beds.)** STAINES GROUP HOSPITAL MANAGEMENT COMMITTEE. Required, RESIDENT HOUSE OFFICER (Male) for general surgical and medical duties. 6 months appointment, not suitable for pre-registration candidates.

Applications, stating age, qualifications and experience, with copies of up to 3 recent testimonials, to Medical Director of Hospital immediately.

**ASHINGTON HOSPITAL, Ashington, Northumberland.** (55 Beds.) WANSBECK HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT SURGICAL OFFICER (Junior Hospital Medical Officer) becoming vacant on 14th December, 1956, at the Ashington Hospital. Salary £775 p.a.–£50–£1075 p.a. New furnished bungalow available.

Applications, stating age, full details of qualifications and experience, together with the names and addresses of 3 referees, should be sent immediately to the Group Secretary, Wansbeck Hospital Management Committee, 12, Stanley-street, Blyth, Northumberland.

**ASHTON, HYDE AND GLOSSOP HOSPITAL MANAGE-**MENT COMMITTEE. JUNIOR HOSPITAL MEDICAL OFFICER (resident) required for Casualty Department, Ashton-under-Lyne General Hospital. Appointment limited to 4 years. Minimum commencing salary £775 p.a. but higher salary may be paid according to experience and qualifications.

Apply, giving age, experience, qualifications and 2 references, to Group Secretary, General Hospital, Ashton-under-Lyne, Lancs.

**AYLESBURY, BUCKINGHAMSHIRE. STOKE MANDE-**VILLE HOSPITAL. RESIDENT HOUSE PHYSICIAN required for the Department of General Medicine. Recognised pre-registration post. Applications from registered practitioners will be considered. Post vacant 13th January, 1957.

Applications, with copies of 2 testimonials, should reach the Administrative Officer by Friday, 7th December, 1956.

**BARNSTAPLE. NORTH DEVON INFIRMARY. (105** Beds.) HOUSE SURGEON (pre-registration). Post vacant early January.

Applications to Group Secretary, North Devon Hospital Management Committee, 19, Alexandra-road, Barnstaple.

**BARROW AND FURNESS HOSPITAL MANAGEMENT** COMMITTEE. Applications are invited for the resident or non-resident post of REGISTRAR in Anæsthetics in the Barrow and Furness Group of hospitals, based at the North Lonsdale Hospital, Barrow-in-Furness. Hospital approved for D.A.

Applications, giving age, details of experience, and names of 3 referees, to Group Secretary, 105, Abbey-road, Barrow-in-Furness.

**BEDFORD (near). BROMHAM HOSPITAL. (434 Beds** for mental defectives and 60 at Annexe near Sandy.) REGISTRAR in Psychiatry required (resident). Hospital may be visited by direct appointment with the Medical Superintendent (phone : Oakley 295).

Application forms obtainable from, and returnable to, Secretary, Bedford Group Hospital Management Committee, 3, Kimbolton-road, Bedford.

**BEDFORD GENERAL HOSPITAL. (439 Beds.) House** SURGEON required. Pre- or post-registration. Recognised for F.R.C.S. Post offers exceptional opportunities for general experience in busy acute Surgical Units.

Inquiries and applications, with copies of 2 recent testimonials, to Group Secretary, 3, Kimbolton-road, Bedford.

**BEDFORD GENERAL HOSPITAL. North West Metro-**POLITAN REGIONAL HOSPITAL BOARD. RESIDENT SENIOR HOUSE OFFICER (obstetrics and gynæcology) required mid-January at the above Hospital. Maternity Unit 60 Beds, Gynæcological Unit 26 Beds. Hospital may be visited by direct appointment.

Detailed applications, with copies of 2 recent testimonials, to Group Secretary, Bedford Group Hospital Management Committee, 3, Kimbolton-road, Bedford, by 21st December, 1956.

**BEVERLEY, YORKSHIRE. WESTWOOD HOSPITAL.** (229 Beds.) HOUSE PHYSICIAN. House Officer or Senior House Officer grading according to experience. Pre-registration post, but fully qualified practitioners may apply.

Apply Group Secretary.

**BURY ST. EDMUNDS. WEST SUFFOLK GENERAL** HOSPITAL. (261 Beds.) HOUSE PHYSICIAN for paediatric and general medical duties ; recognised pre-registration.

Applications, with names of 3 referees, to Hospital Secretary.

**BIDEFORD AND DISTRICT HOSPITAL. (51 Beds.)** Applications invited for post of HOUSE OFFICER, now vacant. Flat available for married officer.

Applications, stating names of 2 referees, to Group Secretary, North Devon Hospital Management Committee, 19, Alexandra-road Barnstaple.

**BIRMINGHAM ACCIDENT HOSPITAL AND REHABILI-**TATION CENTRE, Bath-row, BIRMINGHAM, 15. SENIOR HOUSE SURGEON. Applications for post vacant 1st January. Hospital is largest Traumatic Unit in country and treated 53,000 new patients last year, including 2000 thermal injuries. Post offers ample opportunity for practical experience in management of all types of injury—orthopædic, thoracic, abdominal, and neurosurgical cases. Hospital is recognised for casualty training by Royal College of Surgeons.

Apply, with details naming 2 referees, to Administrator.

**BIRMINGHAM AND MIDLAND EYE HOSPITAL,** Church-street, BIRMINGHAM, 3. HOUSE SURGEON required on 1st March, 1957. Appointment for 6 months, but renewable. Hospital carries resident staff of 5 and provides a 2-year course of instruction. Recognised for the D.O. (England) and F.R.C.S. (England) in Ophthalmology. Wide experience available in all branches, including surgery.

Detailed applications to Group Secretary, Dudley Road Hospital, Birmingham, 18.

**BIRMINGHAM. LORDSWOOD MATERNITY HOS-**PITAL, Lordswood-road, BIRMINGHAM, 17. RESIDENT OBSTETRIC HOUSE OFFICER. Commencing 14th February, 1957, approximately 33 Beds dealing with normal and abnormal midwifery. Recognised for D.Obst.R.C.O.G. Second period training school for pupil midwives.

Apply Obstetrician immediately.

**BIRMINGHAM REGIONAL HOSPITAL BOARD. Mid-**WORCESTERSHIRE GROUP, Birmingham-road, BROMSGROVE. REGISTRAR (general surgery) for Kidderminster General Hospital. Experience specialty essential. Post recognised for F.R.C.S. Resident.

Application form from Group Secretary to be returned by 10th December, 1956.

**BIRMINGHAM REGIONAL HOSPITAL BOARD.**

Whole-time SENIOR REGISTRAR in Psychiatry, All Saints' Hospital, Birmingham (1385 Beds). Candidates should be actively interested in research. Required to reside in Hospital when on duty. Experience specialty and D.P.M. required.

SENIOR REGISTRAR in Psychiatry, Shelton Hospital, Shrewsbury. Wide experience specialty and higher qualification required. Resident.

Successful candidates may subsequently be required to spend not more than 2 years in a selected hospital of the United Birmingham Hospitals in accordance with arrangements for the interchange of Senior Registrars agreed by the Board.

Application forms from Secretary, 10, Augustus-road, Birmingham, 15, to be returned by 17th December, 1956.

**BIRMINGHAM, 29. SELLY OAK HOSPITAL.** (Equipped beds 955.)
HOUSE PHYSICIANS.
HOUSE PHYSICIAN (pædiatrics). Recognised for D.C.H. Some duties at Mosley Hall Hospital for Children.
HOUSE SURGEONS (recognised for F.R.C.S.).
HOUSE SURGEONS (gynæcology and obstetric). Recognised for M.R.C.O.G.
Most of above posts available on 14th January, 1957, and are recognised for Pre-registration Service. Appointments tenable for 6 months.
Apply Medical Superintendent, giving qualifications, age and experience and enclosing copies of 3 testimonials.

**BIRMINGHAM, 13. SORRENTO MATERNITY HOSPITAL.** (106 Beds including 24 premature baby cots.) OBSTETRIC HOUSE SURGEON. Appointment recognised for D.Obst.R.C.O.G. Hospital affiliated to Birmingham Medical School for training of students. Post vacant 1st February, 1957.
Apply Obstetrician by 12th December, 1956.

**BIRMINGHAM. ST. CHAD'S HOSPITAL,** Hagley-road, BIRMINGHAM, 16. SENIOR HOUSE OFFICER in Obstetrics and Gynæcology. Appointment for 12 months and recognised for M.R.C.O.G. Unit affiliated to Birmingham University for undergraduate clinical tuition.
Detailed applications, with copies of 2 recent testimonials, to Group Secretary, Dudley Road Hospital, Birmingham, 18.

**BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS.** THE CHILDREN'S HOSPITAL, Ladywood-road, BIRMINGHAM, 16. Applications are invited for the appointment of RESIDENT SENIOR HOUSE OFFICER to work in the Clinical Pathological Department for 1 year.
Forms of application obtainable from the House Governor and should be returned to him immediately.
G. A. PHALP, Secretary to the Board of Governors

**BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS.** Applications are invited for the post of RESIDENT REGISTRAR in Anæsthetics to the United Birmingham Hospitals. The appointment is tenable for 1 year in the first instance. Preference will be given to candidates who have passed Part I, D.A., or Primary F.F.A.R.C.S.
Application forms may be obtained from the Secretary, United Birmingham Hospitals, Queen Elizabeth Hospital, Birmingham, 15, and should be returned to him by 15th December, 1956.

**BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS.** Applications are invited for the appointment of RESIDENT CLINICAL PATHOLOGIST (Senior House Officer grade) at the Queen Elizabeth Hospital, Birmingham. There are 4 residents attached to the Department of Clinical Pathology. In addition to affording general experience in hæmatology, bacteriology and some biochemistry, the appointment can provide opportunities for those studying for higher qualifications in medicine. The appointment is tenable for 1 year.
Application forms should be obtained from the Secretary, to the Board of Governors, United Birmingham Hospitals, Queen Elizabeth Hospital, Birmingham, 15, and should be returned to him as soon as possible.

**BISHOP AUCKLAND. THE GENERAL HOSPITAL.** HOUSE OFFICER (obstetrics and gynæcology). Applications invited from registered or pre-registration practitioners. Vacant 1st January, 1957. Recognised for D.Obst.R.C.O.G. Departmental Beds 69.
Apply, naming 2 referees, to Group Secretary, South West Durham Hospital Management Committee, at above address.

**BLACKBURN AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE.** Applications are invited for the following posts :—
**Victoria Hospital, Accrington**
SENIOR HOUSE OFFICER (medicine), vacant middle of January, 1957.
HOUSE PHYSICIAN, vacant early January, 1957. Post recognised for pre-registration purposes.
Apply to Secretary, Hospital Management Committee Office, Royal Infirmary, Blackburn.

**BLACKBURN AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE.** SENIOR HOUSE OFFICER (pædiatrics) required 2nd January, 1957. Post recognised for D.C.H. and duties as laid down by Consultant Pædiatrician, at Queen's Park Hospital and Royal Infirmary, Blackburn, Victoria Hospital, Accrington (General Hospitals), and Park Lee Hospital, Blackburn (I.D. Hospital).
Apply to Secretary, Hospital Management Committee Office, Royal Infirmary, Blackburn.

**BLACKBURN. ROYAL INFIRMARY. (262 acute beds.)** BLACKBURN AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (general surgery) required 1st January, 1957, at the above Infirmary. Recognised for F.R.C.S.
Apply to Secretary, Hospital Management Committee Office, Royal Infirmary, Blackburn.

**BOURNEMOUTH. ROYAL VICTORIA HOSPITAL,** Shelley-road. BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of GENERAL HOUSE SURGEON, which becomes vacant on 28th December. Favourable consideration will be given to suitable applicants for subsequent House Physician appointments. The appointment is recognised for the F.R.C.S. examination and for pre-registration purposes.
Applications to the Hospital Secretary.

**BRIGHTON. NEW SUSSEX HOSPITAL FOR WOMEN,** Windlesham-road, BRIGHTON. Vacancy for HOUSE PHYSICIAN (Female) for 6 months commencing 1st December, 1956. Includes duties in Gynæcological Department. Open to pre-registration candidates.
Applications, stating age, nationality, qualifications and experience, with copies of 2 testimonials and/or names of referees, to be sent to the Administrative Officer as soon as possible.

**BRIGHTON. ROYAL SUSSEX COUNTY HOSPITAL.** (312 Beds.) HOUSE SURGEON (including gynæcology) required beginning of January. Pre-registration and recognised for F.R.C.S.
Applications, stating usual particulars, and naming 2 referees, to the Administrative Officer, Royal Sussex County Hospital, Brighton, 7.

**BRISTOL. COSSHAM/FRENCHAY HOSPITAL MANAGEMENT COMMITTEE.** FRENCHAY HOSPITAL. (542 staffed beds —expanding.) Vacancy shortly occurs for the post of SENIOR HOUSE OFFICER (Regional Department of Neurosurgery), tenable for 6–12 months. The post offers useful surgical experience and the opportunity of gaining a working knowledge of neurological diagnosis. Recognised for F.R.C.S.
Applications to the Secretary, Frenchay Hospital, quoting "N.S.F." Names of 2 referees required.

**BRISTOL GROUP OF CLINICS.** Applications are invited for the post of ASSISTANT VENEREOLOGIST (Junior Hospital Medical Officer), Male, in the above Clinics.
Applications, giving details of qualifications, experience, &c., and names and addresses of 2 referees, to be forwarded to the Secretary, Ham Green Hospital, Pill, near Bristol.

**BRISTOL (near). HAM GREEN HOSPITAL, Pill, near** BRISTOL. Applications are invited for the post of JUNIOR HOSPITAL MEDICAL OFFICER in the Tuberculosis Wards of the above Hospital. The Hospital is fully equipped for modern treatment of pulmonary tuberculosis, including regular major thoracic surgery ; opportunities also for work in the Bristol Chest Clinic. Appointment for 1 year, renewable. Post now vacant.
Applications, with testimonials or names of referees, should be sent to the Hospital Secretary, Ham Green Hospital, Pill, near Bristol.

*AMENDED*

**BRISTOL. THE BOARD OF GOVERNORS OF THE UNITED BRISTOL HOSPITALS AND THE SOUTH-WESTERN REGIONAL HOSPITAL BOARD.** Applications are invited by the above Boards for the joint appointment of SENIOR SURGICAL REGISTRAR. The appointment will be held for 1 year in the first instance. The successful candidate will be appointed initially to work at Southmead Hospital, Bristol, and in other hospitals in the Bristol Clinical Area as required by the Regional Board from time to time. He will be transferred to the United Bristol Hospitals when a vacancy arises.
Applications, stating date of birth, qualifications and experience, together with the names and addresses of 2 referees, should be sent to the Secretary of the Regional Hospital Board, 27, Tyndalls Park-road, Bristol, 8, not later than 15th December, 1956.

**BROMLEY. LENNARD AND FARNBOROUGH HOSPITALS.** HOUSE PHYSICIAN required immediately for Geriatric Unit with beds at the above Hospitals. Excellent experience in investigation and treatment of acute and chronic diseases in the elderly, and good facilities for reading. Opportunity for experience with children (Infectious Diseases) at the Lennard Hospital.
Apply, stating full particulars, and naming 2 referees, to Administrative Officer, Bromley Hospital, Bromley, Kent.

**BROXBURN, WEST LOTHIAN. BANGOUR GENERAL HOSPITAL.** E.N.T. UNIT. Applications are invited for the post of REGISTRAR in the E.N.T. Unit at Bangour General Hospital, Broxburn (15 miles from Edinburgh), which carries certain minimal duties at the Royal Infirmary, Edinburgh. The Unit comprises 40 Beds and also undertakes oral dental surgery. Salary and conditions of service will be in accordance with the regulations.
Applications, giving age, qualifications, and particulars of previous experience, should be lodged with the Group Secretary and Treasurer, Bangour General Hospital, Broxburn, West Lothian.

**BROXBURN, WEST LOTHIAN. BANGOUR GENERAL HOSPITAL.** Applications are invited for the post of SENIOR HOUSE OFFICER (anæsthetics). Post recognised for D.A. and F.F.A.R.C.S.
Applications, naming 2 referees, to the Group Secretary and Treasurer, Board of Management, Bangour Hospital, Broxburn, West Lothian, within 14 days.

**BURY AND ROSSENDALE HOSPITAL MANAGEMENT COMMITTEE.** ROSSENDALE GENERAL HOSPITAL. Applications are invited for the pre-registration post of HOUSE OFFICER in General Surgery at the above Hospital.
Apply, stating age, nationality, and full details, together with names of 2 referees, to H. WILKINSON, Group Secretary.
Bury General Hospital, Bury, Lancs.

**CHERTSEY, SURREY. ST. PETER'S HOSPITAL** (late Botleys Park War Hospital). (430 Beds.) ORTHOPÆDIC HOUSE SURGEON required immediately. 100 orthopædic beds. Senior House Officer or House Officer (intern grade). Post recognised for F.R.C.S. and Pre-registration Service. Preference given to provisionally registered candidates. Salary in accordance with terms and conditions of National Health Service.
Applications, together with names and addresses of referees, to be sent to the Physician-Superintendent, St. Peter's Hospital, Chertsey, as soon as possible.

**CARLUKE, LANARKSHIRE. LAW HOSPITAL.** Applications are invited for the following resident posts (pre- or post-registration) for the 6 months commencing 1st February, 1957 :—
GYNÆCOLOGICAL HOUSE OFFICER (post recognised for M.R.C.O.G.).
ORTHOPÆDIC HOUSE OFFICER.
Applications, stating age, qualifications and any previous experience, together with the names of 2 referees, should be submitted to the Group Medical Superintendent, Law Hospital, Carluke.

**CARDIFF. GLAN ELY HOSPITAL, Fairwater, Cardiff.** SENIOR HOUSE OFFICER required at above Hospital.
Form of application from Group Secretary, Cardiff Hospital Management Committee, 44, Cathedral-road, Cardiff.

**CARDIFF. UNITED CARDIFF HOSPITALS. Llandough** HOSPITAL. Applications are invited for the post of MEDICAL REGISTRAR to the Miners' Chest Diseases Treatment Centre at Llandough Hospital, Penarth. The Centre caters for all types of chest diseases and it is closely associated with the adjoining Pneumoconiosis Research Unit of the Medical Research Council.
Application forms may be obtained from the Secretary to the Board at the Cardiff Royal Infirmary, Newport-road, Cardiff, and should be returned by 17th December.

**CARDIFF. UNITED CARDIFF HOSPITALS. Llandough** HOSPITAL. Applications are invited for the post of SENIOR HOUSE OFFICER (medical) to the Miners' Chest Diseases Treatment Centre at Llandough Hospital, Penarth. The Centre caters for all types of chest diseases and it is closely associated with the adjoining Pneumoconiosis Research Unit of the Medical Research Council.
Application forms are obtainable from the Secretary to the Board at Cardiff Royal Infirmary, Newport-road, Cardiff, and should be returned by 17th December.

**CARSHALTON. QUEEN MARY'S HOSPITAL FOR** CHILDREN. (853 Beds.) ORTHOPÆDIC REGISTRAR, with some surgical duties, required. Applicants are invited to visit the Hospital by appointment with the Physician-Superintendent.
Applications should be made on forms obtainable from the Group Secretary.

**CARSHALTON, SURREY. ST. HELIER HOSPITAL.** Applications invited for the post of SENIOR SURGICAL REGISTRAR which becomes vacant at the end of February. The post is open to Dominion graduates only, and is tenable for a period of 2 years. Possession of F.R.C.S. necessary.
Forms of application, to be returned by 21st December, may be obtained from the Group Secretary at above address.

**CASTLEFORD, NORMANTON AND DISTRICT HOS-**PITAL. HIGHTOWN, CASTLEFORD. RESIDENT SURGICAL OFFICER (Senior House Officer grade) required. Self-contained flat available for married accommodation. Post vacant 1st January, 1957.
Applications to the Secretary, Pontefract and Castleford Hospital Management Committee, Great Northern House, Salter-row, Pontefract, Yorkshire.

**CHATHAM. ALL SAINTS' HOSPITAL. Medway and** GRAVESEND HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for post of HOUSE SURGEON, vacant now, which is recognised for Pre-registration Service. Salary £425–£525 p.a., according to experience.
Applications, stating age, qualifications, nationality and experience, together with copies of 3 recent testimonials, to be addressed to the Hospital Secretary.

**CHELTENHAM GENERAL EYE AND CHILDREN'S** HOSPITAL. (CHILDREN'S DEPARTMENT.) Applications are invited for the post of RESIDENT MEDICAL OFFICER (Senior House Officer grade) for the Children's Department (54 Beds). The appointment which is recognised for candidates entering for the D.C.H. offers scope for wide experience in all Departments of Paediatrics, surgical cases, and attendance at Outpatient Departments at the General Hospital. Previous hospital experience in paediatrics is desirable.
Applications, together with copies of 3 testimonials, should be addressed to S. T. DAVIS, Group Secretary, General Hospital, Cheltenham.

**CHICHESTER. ST. RICHARD'S HOSPITAL. (400 Beds.)** CHICHESTER GROUP HOSPITAL MANAGEMENT COMMITTEE. Required, 2 HOUSE SURGEONS (pre-registration) for 6 months only in the first instance. Posts vacant 1st January, 1957. The Men or Women appointed will work primarily in the surgical wards of the Hospital. Hospital recognised for F.R.C.S.
Applications, stating age, qualifications and experience, giving names of 2 persons from whom reference may be obtained, should be sent to the Surgeon-Superintendent.

**COLCHESTER. ESSEX COUNTY HOSPITAL. (188** Beds.) Applications invited for post of SENIOR HOUSE OFFICER to Casualty and Radiotherapy Departments. Post tenable for 6 months or 1 year. Recognised for F.R.C.S.
Applications, with copies of 3 testimonials, to Group Secretary, Colchester Hospital Management Committee, 14, Pope's-lane, Colchester, Essex.

**CREWE AND DISTRICT MEMORIAL HOSPITAL.** REGISTRAR (Orthopædic Department) required. Modern Theatres and Accident Department almost ready for occupation. Full traumatic and orthopædic service now being developed. Salary and conditions as per regulations.
Applications, stating age, qualifications and experience, together with names of 3 referees, to Group Secretary, South Cheshire Hospital Management Committee, Barony Hospital, Nantwich.

**CROYDON GROUP HOSPITAL MANAGEMENT COM-**MITTEE. EYE UNIT. CLINICAL ASSISTANT for 3 sessions weekly at Eye Unit adjacent to Mayday Hospital. Payment £175 p.a. per half-day session. Higher qualification in ophthalmology desirable.
Applications in writing to GEORGE A. PAINES, Secretary, Management Committee, General Hospital, London-road, Croydon.

**CROYDON. MAYDAY HOSPITAL. (611 Beds.) Croydon** GROUP HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON (pre-registration) required from mid-December, 1956. Post recognised for F.R.C.S. examination.
Application forms obtainable from GEORGE A. PAINES, Secretary, Hospital Management Committee, General Hospital, London-road, Croydon.

**DONCASTER ROYAL INFIRMARY. (330 Beds. Recog-**nised for training for F.R.C.S. examination.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time REGISTRAR (orthopædics) required. Appointment for 1 year in first instance.
Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 10th December, 1956, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

**DRIFFIELD, YORKSHIRE. NORTHFIELD SANATOR-**IUM. (78 Beds.) SENIOR HOUSE PHYSICIAN, vacant now. Offers experience all branches of tuberculosis within Group, including surgery, M.M.R., and clinics. Time for study. Ex-patients welcome. £150 for full residence.
Applications to Group Secretary, Westwood Hospital, Beverley, Yorkshire.

**DUDLEY, STOURBRIDGE AND DISTRICT HOSPITAL** GROUP. BIRMINGHAM REGION.

**The Guest Hospital, Dudley** (154 Beds)
SENIOR HOUSE OFFICER (surgical). Post now vacant.
HOUSE OFFICER (medical), pre-registration. Post vacant January, 1957.
HOUSE OFFICER (surgical), pre-registration. Post vacant January, 1957.

**The Corbett Hospital, Stourbridge** (114 Beds)
HOUSE OFFICER (surgical), pre-registration. Post vacant January, 1957.

Apply, Group Secretary, Guest Hospital, Dudley.

**EAST ANGLIAN REGIONAL HOSPITAL BOARD.** SURGICAL REGISTRAR, Ipswich and East Suffolk Hospital. Recognised for F.R.C.S. Appointment for 1 year renewable for second year.
Applications, stating age, experience and the names of 3 referees, to the Board's Senior Administrative Medical Officer, 117, Chesterton-road, Cambridge, by 10th December, 1956. Candidates invited to visit Hospital by direct arrangement with Hospital Management Committee Secretary, Ipswich and East Suffolk Hospital (Anglesea Road Wing), Ipswich.

**EDGWARE GENERAL HOSPITAL, Edgware, Middlesex.** RESIDENT DENTAL HOUSE SURGEON for above Hospital Junior or Senior post, according to experience. 6 months appointment vacant 9th January, 1957. Post approved for Dental Fellowship (England and Edinburgh).
Applications, stating age, qualifications, experience, and enclosing copies of up to 3 recent testimonials, to Medical Director of Hospital.

**EDGWARE GENERAL HOSPITAL, Edgware, Middlesex.** (715 Beds.) RESIDENT SENIOR CASUALTY HOUSE OFFICER required at above Hospital. Post vacant 7th January, 1957, and recognised for F.R.C.S. purposes.
Apply immediately, stating age, nationality, qualifications and experience, together with the names and addresses of 2 referees, to Group Secretary, Edgware General Hospital.

**ENFIELD, MIDDLESEX. CHASE FARM HOSPITAL.** RESIDENT SENIOR HOUSE OFFICER required in the Department of Anæsthesia, vacant 16th January, 1957 (12 months appointment). The post is recognised for the D.A. and F.F.A.R.C.S. and affords a wide range of practical experience and tuition under Consultant supervision.
Applications, giving names and addresses of 2 referees, to the Group Secretary, Enfield Group Hospital Management Committee, at Chase Farm Hospital.

**EPSOM DISTRICT HOSPITAL, Dorking-road, Epsom.** RESIDENT HOUSE SURGEON required 19th January for Orthopædic, E.N.T. and Eye Departments. Pre-registration post.
Applications, stating age, qualifications, and experience, with copies of 2 recent testimonials, should be sent immediately to Group Secretary at above address.

**EPSOM, SURREY. LONG GROVE HOSPITAL (for** mental and nervous disorders). (2300 Beds.) SOUTH WEST METROPOLITAN REGION. Applications invited for the appointment of Whole-time PSYCHIATRIC REGISTRAR. The Hospital affords opportunity for experience of all modern methods of investigation and treatment. There is an extensive Outpatient Service and facilities are given for the study for the D.P.M. (The Hospital is approved for the conjoint D.P.M.)
Application forms obtainable from Secretary to whom they should be returned by 14th December. Candidates welcome to visit Hospital by appointment with Physician-Superintendent.

**EPSOM, SURREY. WEST PARK HOSPITAL. Junior** HOSPITAL MEDICAL OFFICER required. Salary scale £775–£1075. Subject to Whitley Council conditions and National Health Service superannuation regulations. West Park is a psychiatric hospital with 2400 Beds, where all modern treatments are practised. A good knowledge of general medicine is essential. Applicants may be of either sex, and single quarters are available.
Applications, including the names of 3 referees, should be sent to the Physician-Superintendent within 10 days.

**GLASGOW NORTH-EASTERN MENTAL HOSPITALS** BOARD OF MANAGEMENT require SENIOR HOUSE OFFICER (resident) for Woodilee Mental Hospital, Lenzie (1272 Beds). Salary £745 p.a. Outpatient clinic. Facilities for taking D.P.M. Unfurnished flat available as married quarters.
Applications, stating age, training, experience, qualifications and names of 2 referees, to the Medical Superintendent.

**GLASGOW, E.3. ROBROYSTON HOSPITAL.** Applications are invited for the post of JUNIOR HOSPITAL MEDICAL OFFICER at the above-named Hospital. Salary and conditions according to national scale and post is resident or non-resident. The Hospital treats all forms of tuberculosis both medical and surgical. Thoracic and urogenital tuberculosis form a major part of the operative work.
Further particulars may be obtained from the Physician-Superintendent, to whom applications should be made as soon as possible.

**GLASGOW ROYAL INFIRMARY. Senior House Officer** in Pathology. Duties at above Infirmary.

Write, giving 3 names for reference, not later than 5th December, 1956, to the Secretary, Board of Management for Glasgow Royal Infirmary and Associated Hospitals, 135, Buchanan-street, Glasgow, C.1.

**GLASGOW ROYAL INFIRMARY. Senior House Officer** in Cardiology. Duties at above Infirmary.

Write, giving 3 names for reference, not later than 5th December, 1956, to the Secretary, Board of Management for Glasgow Royal Infirmary and Associated Hospitals, 135, Buchanan-street, Glasgow, C.1.

**GLASGOW ROYAL INFIRMARY. Senior House Officer** in Medicine. Duties at above Infirmary.

Write, giving 3 names for reference, not later than 6th December, 1956, to the Secretary, Board of Management for Glasgow Royal Infirmary and Associated Hospitals, 135, Buchanan-street, Glasgow, C.1.

**GRANTHAM AND KESTEVEN GENERAL HOSPITAL.** (118 Beds. Recognised for training for F.R.C.S.) SHEFFIELD REGIONAL HOSPITAL BOARD. SECOND RESIDENT SURGICAL OFFICER with duties in orthopædics, gynæcology, E.N.T., and relief duties for Resident Surgical Officer required at Registrar rate of pay. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 10th December, 1956, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

**GRAVESEND AND NORTH KENT HOSPITAL.** (145 Beds—4 Residents.) MEDWAY AND GRAVESEND HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the resident post of HOUSE SURGEON (with opportunity of experience in obstetrics and gynæcology), vacant now. Approved under pre-registration regulations. Post tenable for 6 months at a salary of £425–£525 p.a. according to experience.

Applications, stating age, nationality, qualifications and experience, to be addressed to the Hospital Secretary.

**GUILDFORD. ROYAL SURREY COUNTY HOSPITAL.** (233 Beds.) CASUALTY OFFICER required. The post is recognised for F.R.C.S. examination and the grading is that of Senior House Officer. 2 Casualty Officers are employed who share the work of the department which is part of the Orthopædic and Traumatic Unit. Regular instruction is given in traumatic surgery and the Casualty Officers take part in the work of the fracture clinics. Post is vacant on 7th January.

Applications, with copies of testimonials, to Hospital Secretary.

**HALIFAX. ROYAL HALIFAX INFIRMARY. (301 Beds.)** SENIOR HOUSE OFFICER in Casualty and Orthopædic Surgery required. Post recognised for F.R.C.S. Salary £745 p.a. with deduction of £150 p.a. for board, residence, &c.

Apply to the Group Secretary, Royal Halifax Infirmary, Halifax.

**HASTINGS. ST. HELEN'S HOSPITAL. (493 Beds.)** HOUSE SURGEON. Pre-registration post recognised for F.R.C.S. Vacant 26th December.

Apply to Hospital Administrator by 5th December, 1956.

**HASTINGS. ST. HELEN'S HOSPITAL. (493 Beds.)** HOUSE PHYSICIAN. Pre-registration post vacant 28th December.

Applications to be sent by 7th December to Hospital Administrator.

**HILLINGDON HOSPITAL, Uxbridge, Middlesex. (621 Beds.)** CASUALTY OFFICER, whole-time duties under Medical Director will include dealing with casualties and admissions to Hospital and such other duties as may be required. Post recognised for F.R.C.S. Junior Hospital Medical Officer scale.

Apply, with copies of 3 recent testimonials, to Medical Director by 11th December.

**HITCHIN HOSPITALS, Hitchin, Hertfordshire. Resident** ANÆSTHETIST (Senior House Officer) required 1st January, 1957. The post offers varied experience, and is recognised for the D.A. and F.F.A.R.C.S. examinations.

Applications, stating age, nationality, qualifications and experience, together with names of 2 referees, to be sent to the Medical Administrator, Lister Hospital, Hitchin, as soon as possible.

**HUDDERSFIELD ROYAL INFIRMARY. (312 Beds.)** HUDDERSFIELD HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from provisionally registered medical practitioners for the post of HOUSE PHYSICIAN, to commence duties on 14th December, 1956. Salary in accordance with national scale.

Applications, together with copies of 3 recent testimonials, to be addressed to the undersigned as soon as possible.

H. J. JOHNSON, Secretary to the Management Committee.

The Royal Infirmary, Huddersfield.

**HEMEL HEMPSTEAD, HERTFORDSHIRE. WEST HERTS HOSPITAL.** CASUALTY OFFICER (Junior Hospital Medical Officer) required.

Applications, stating 2 names for reference, should be sent to the Hospital Secretary.

**HEMEL HEMPSTEAD, HERTFORDSHIRE. WEST HERTS HOSPITAL.** Applications are invited for the post of SENIOR HOUSE OFFICER (pædiatrics) which is recognised for the D.C.H.

Applications, giving 2 names for reference, should be sent to the Hospital Secretary at once.

**HERTFORD COUNTY HOSPITAL. (171 Beds. Hospital** situated 21 miles from London.) RESIDENT CASUALTY OFFICER (Senior House Officer grade) with attachment to Pædiatrician and Ophthalmic Consultant. Salary £745 p.a., less £150 p.a. residential emoluments. Recognised under F.R.C.S. regulations. Appointment to commence 1st December, 1956.

Apply, with full details and references, to Group Secretary, Hertford Hospital Management Committee, County Hospital, Hertford, Herts.

**HERTFORD COUNTY HOSPITAL. (171 Beds. Hospital** situated 21 miles from London.) Applications are invited for the undermentioned appointments :—

HOUSE SURGEON (general) first or second post. To commence 1st January, 1957.

HOUSE SURGEON (general, gynæcology, and obstetrics), first or second post. To commence 1st January, 1957.

Pre-registration posts ; recognised under F.R.C.S. regulations.

Applications to Group Secretary, Hertford Hospital Management Committee, County Hospital, Hertford, Herts.

**HOUNSLOW HOSPITAL, Staines-road, Hounslow,** MIDDLESEX. (General Acute—81 Beds.) Applications are invited for the appointment of RESIDENT HOUSE SURGEON. Recognised pre-registration appointment for 6 months. Vacant 20th December, 1956.

Applications, stating qualifications and age, together with copies of up to 3 recent testimonials, or names for reference, to the Hospital Secretary.

**HOUNSLOW HOSPITAL, Staines-road, Hounslow,** MIDDLESEX. (General Acute—81 Beds.) Applications are invited for the appointment of RESIDENT HOUSE PHYSICIAN. Recognised pre-registration appointment for 6 months. Vacant 10th December, 1956.

Applications, stating qualifications and age, together with copies of up to 3 recent testimonials, or names for reference, to the Hospital Secretary.

**ILFORD AND BARKING GROUP HOSPITAL MANAGEMENT COMMITTEE.** There is a vacancy for a SENIOR HOUSE OFFICER ANÆSTHETIST at King George Hospital, Ilford. The officer appointed will be required to be available for duty in other Hospitals in the Group. Salary will be at the rate of £745 p.a., less £150 p.a. emoluments.

Applicants should have been registered not less than 1 year, and should send applications, accompanied by copies of 3 testimonials, to the undersigned within 7 days of the appearance of this advertisement. H. F. HARRIS, Group Secretary.

King George Hospital, Ilford.

**ILFORD. KING GEORGE HOSPITAL, Eastern-avenue,** ILFORD. There will be a vacancy for a HOUSE SURGEON at above Hospital on 31st December, 1956. First or second post pre-registration. The post will be tenable for 6 months.

Applications, giving full particulars and accompanied by testimonials, should be sent to the undersigned within 7 days of the appearance of this advertisement.

H. F. HARRIS, Group Secretary, Ilford
and Barking Group Hospital Management Committee.

**IPSWICH AND EAST SUFFOLK HOSPITAL. Anglesea** ROAD WING. (356 Beds.) Applications are invited for the post of HOUSE SURGEON to the Fracture and Orthopædic Department, vacant on 1st January, 1957. Approved pre-registration post.

Applications, with copies of recent testimonials, to the Hospital Secretary.

**IPSWICH AND EAST SUFFOLK HOSPITAL. Anglesea** ROAD WING. (356 Beds.) Applications are invited for the post of HOUSE SURGEON to Consultant General Surgeon. The post is recognised for pre-registration and for the F.R.C.S. examinations.

Applications, with copies of recent testimonials, to Hospital Secretary.

**IPSWICH AND EAST SUFFOLK HOSPITAL. Anglesea** ROAD WING. (356 Beds.) Applications are invited for the post of HOUSE SURGEON to the E.N.T. and Ophthalmic Departments, vacant on 15th December, 1956. The post is recognised for pre-registration and for the D.L.O. examination.

Applications, giving full particulars and copies of recent testimonials, to Hospital Secretary.

**IPSWICH AND EAST SUFFOLK HOSPITAL. Anglesea** ROAD WING. (356 Beds.) Applications are invited for the post of CASUALTY OFFICER (Senior House Officer grade), vacant on 1st January, 1957. The post is recognised for the F.R.C.S. examination.

Applications, stating age and nationality, together with copies of recent testimonials, to Hospital Secretary.

**ISLE OF THANET HOSPITAL MANAGEMENT COMMITTEE.**

**General Hospital, Ramsgate** (101 Beds)
HOUSE SURGEON.

**General Hospital, Margate** (132 Beds)
HOUSE SURGEON.

Approved pre-registration posts. Salary at the rate of £425–£525 p.a. according to experience, less £125 for residential emoluments.

Applications, with copies of testimonials, to Hospital Secretary of appropriate Hospital.

**ISLEWORTH. WEST MIDDLESEX HOSPITAL. South** WEST MIDDLESEX HOSPITAL MANAGEMENT COMMITTEE. Locum Tenens SENIOR MEDICAL REGISTRAR required for approximately 7 months or shorter period from 1st January.

Applications, stating age, nationality, qualifications and experience with names of 3 referees, to Medical Director, West Middlesex Hospital, Isleworth, Middlesex, by 12th December, 1956.

**KIRKCALDY, FIFESHIRE. VICTORIA HOSPITAL.** HOUSE OFFICER required for duty in the geriatric and acute medical wards. The post qualifies for pre-registration.

Apply, stating names of 2 referees, to the Medical Superintendent, East Fife Hospitals Board of Management, 243A, High-street, Kirkcaldy.

**LEEDS. THE UNITED LEEDS HOSPITALS. The** GENERAL INFIRMARY AT LEEDS. REGISTRAR in Dermatology required, for 1 year in first instance, from January, 1957. Terms and conditions of service for hospital medical staff apply.

Applications, stating age, qualifications, previous posts with dates, and 3 names for reference, should be sent to the Sub-Dean, School of Medicine, Leeds, 2, by 6th December, 1956.

**LEEDS. THE UNITED LEEDS HOSPITALS.** The GENERAL INFIRMARY AT LEEDS. Applications are invited for the post of SENIOR REGISTRAR in E.N.T. Surgery, for 1 year in the first instance. Terms and conditions of service for hospital Medical staff apply.

Applications, stating age, qualifications, publications, previous posts with dates, with 3 names for reference, should be sent to the Sub-Dean, School of Medicine, Leeds, 1, not later than 8th December, 1956.

**LEEDS. UNITED LEEDS HOSPITALS/LEEDS** REGIONAL HOSPITAL BOARD.

REGISTRAR in Neurology. Duties divided between Department of Neurology at the General Infirmary at Leeds and the Pinderfields General Hospital, Wakefield.

REGISTRAR in Thoracic Surgery. First year normally at the Regional Thoracic Centre, Pinderfields General Hospital, Wakefield (56 Beds), which is under the charge of the Consultants to the Teaching Hospital. Second year if possible at the General Infirmary at Leeds.

Applications, stating age, qualifications and details of present and previous appointments with dates, together with the names and addresses of 3 referees, to the Secretary, Joint Registrars Committee, Park-parade, Harrogate, by 13th December, 1956.

**LEEDS REGIONAL HOSPITAL BOARD.** Registrar vacancies.

*Chest Diseases*

Leeds Chest Clinic and additional duties, as required, at Regional Sanatoria. Previous experience in diseases of the chest desirable. Accommodation for single person only at Killingbeck Hospital.

*Obstetrics and Gynæcology*

Dewsbury, Batley and Mirfield Group. Resident. (Aggregate of 100 obstetric and 22 gynæcological beds.) Recognised for D.Obst.R.C.O.G.

*Orthopædic Surgery*

(*a*) Bradford Royal Infirmary (62 orthopædic beds) with additional duties as required at other orthopædic units in the Bradford A Group. Non-resident.

(*b*) St. James's Hospital, Leeds (64 orthopædic beds), and the Public Dispensary, Leeds. Non-resident.

*Psychiatry*

Stanley Royd Hospital, Wakefield (approximately 2000 Beds). Accommodation for single person available if required. Married accommodation may be available. If desired, facilities for attendance at The Leeds University will be provided if the successful candidate is studying for the D.P.M.

Applications, stating age, qualifications and details of previous and present appointments with dates, together with the names and addresses of 3 referees, to the Secretary, Joint Registrars Committee, Park-parade, Harrogate, by 13th December, 1956.

**LEEDS REGIONAL HOSPITAL BOARD.** Short-term LOCUM TENENS appointments in the Registrar grade are constantly available at hospitals in the area of the Board, particularly in the specialties of anæsthetics, general medicine, general and orthopædic surgery, and psychiatry.

Interested practitioners, suitably experienced, should communicate with the Secretary, Joint Registrars Committee, Park-parade, Harrogate.

**LUTON AND DUNSTABLE HOSPITAL, CHILDREN'S** ANNEXE, LUTON, BEDS. RESIDENT PÆDIATRIC HOUSE OFFICER required 1st January, 1957. The post is recognised for the D.C.H., and as a second pre-registration post in medicine. The duties will cover both medical and surgical wards.

Applications, stating age, nationality, qualifications and experience, together with copies of 3 recent testimonials, to be sent as soon as possible to the Secretary, Luton and Hitchin Group Hospital Management Committee, St. Mary's Hospital, Luton, Beds.

**LIVERPOOL RADIUM INSTITUTE, Liverpool, 7.** Applications are invited for a resident post in the JUNIOR HOSPITAL MEDICAL OFFICER grade. Salary scale £755–£50–£1075 according to experience. This appointment is particularly valuable to practitioners who contemplate adopting radiotherapy as a special career. On the other hand, it provides an excellent opportunity for studying for a higher qualification either in medicine or in surgery.

Applications, giving particulars of age and experience, together with names and addresses of 2 referees, should reach the Medical Director as soon as possible.

**LIVERPOOL, 15. SEFTON GENERAL HOSPITAL.** (995 Beds, 116 Cots.) Applications are invited for the following resident appointments which will become vacant at the above-named Hosp tal on 1st March, 1957, and will be for a period of 6 months. These posts are approved as pre-registration posts.

6 HOUSE PHYSICIANS (general).
2 HOUSE PHYSICIANS (psychiatric).
3 HOUSE SURGEONS (general).
2 HOUSE SURGEONS (obstetric).
1 HOUSE PHYSICIAN (tropical).

The terms and conditions of service will be in accordance with the regulations of the Ministry of Health.

Application forms may be obtained from the undersigned to whom they should be returned not later than Thursday, 20th December, 1956.

GARNET CHAPLIN, Secretary to the Committee,
South Liverpool Hospital Management Committee.

**LIVERPOOL. THE UNITED LIVERPOOL HOSPITALS.** ST. PAUL'S EYE HOSPITAL. Applications are invited for a post of REGISTRAR in Ophthalmology for the period to 30th September, 1957. Annual reappointment thereafter until completion of the normal period of training will be considered without the need for further application. The post is non-resident but it may be possible to offer the successful candidate tenancy of a furnished flat for a limited period.

Apply by 12th December, 1956, on form obtainable from the Secretary, The United Liverpool Hospitals, 80, Rodney-street, Liverpool, 1.

**LIVERPOOL. THE UNITED LIVERPOOL HOSPITALS.** Applications are invited for a post of REGISTRAR in Pathology for the period to 30th September, 1957, with duties at the Royal Liverpool Children's Hospital, Women's Hospital, and Liverpool Maternity Hospital. The successful candidate will be eligible to apply for reappointment for a further period from 1st October, 1957. The post is non-resident but it may be possible to offer tenancy of a furnished flat for a limited period.

Apply by 12th December, 1956, on form obtainable from the Secretary, The United Liverpool Hospitals, 80, Rodney-street, Liverpool, 1.

**LLWYNPIA HOSPITAL, Llwynpia, Rhondda.** (Acute medical) beds and chronic sick beds.) HOUSE OFFICER (medical). Person appointed will also undertake duties at the Group Infectious Diseases Hospital when required.

Applications, stating age, qualifications and experience, together with copies of 2 recent testimonials, to be sent to the Group Secretary, Pontypridd and Rhondda Hospital Management Committee, Courthouse-street, Pontypridd.

**LOUTH, LINCOLNSHIRE. COUNTY HOSPITAL.** (215 Beds.) GRIMSBY HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER (surgical), vacant 5th January, 1957, at this General Hospital.

Applications, giving full details, together with the names of 2 referees, should be addressed to the Hospital Secretary.

**LOUTH, LINCOLNSHIRE. COUNTY HOSPITAL.** (215 Beds.) GRIMSBY HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the pre-registration post of HOUSE OFFICER (surgical), vacant 5th January next.

Applications, giving full details, together with the names of 2 referees, should be addressed to the Hospital Secretary.

**LOWESTOFT AND NORTH SUFFOLK HOSPITAL,** LOWESTOFT, SUFFOLK. (98 Beds.) HOUSE PHYSICIAN required early January next. The post is recognised for Pre-registration Service and the Hospital is regularly visited by Consultant staff from the Norfolk and Norwich Hospital. Salary £425, £475 or £525 p.a., according to experience, less £125 for residence. Alternatively, as Senior House Physician, salary £745 p.a., less £150 for residence. Membership of a Medical Defence Society is a condition of appointment.

Applications, stating age, qualifications and experience, with names of 2 referees, to Hospital Secretary.

**MANSFIELD. HARLOW WOOD ORTHOPÆDIC HOSPITAL.** (328 Beds. Recognised for the F.R.C.S.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT REGISTRAR (orthopædics) required. Duties include attendance at associated outpatient clinics and Hospital. As well as the usual long-term training and traumatic experience, this will also include working with the Hand Surgery Unit. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 10th December, 1956, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

**MANCHESTER, 4. ANCOATS HOSPITAL.** Applications are invited for the post of REGISTRAR in Medicine (Resident Medical Officer), vacant 2nd January, 1957.

Applications, with names of 2 referees, by 10th December, 1956, to Group Secretary, North Manchester Hospital Management Committee, Crumpsall Hospital, Manchester.

**MANCHESTER, 8. CRUMPSALL HOSPITAL.** Applications are invited for the resident appointment of SENIOR HOUSE OFFICER in the Genito-urinary Department, with general surgical work in another unit at the above Hospital. Recognised for F.R.C.S. Vacant 1st February, 1957.

Applications, with names of 2 referees, by 10th December, 1956, to Group Secretary, North Manchester Hospital Management Committee, Crumpsall Hospital, Manchester.

**MANCHESTER, 19. DUCHESS OF YORK HOSPITAL** FOR BABIES. SOUTH MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. There will be a vacancy at the above Hospital, which is associated with the Manchester University for teaching purposes, for a RESIDENT HOUSE OFFICER (Male or Female), post- or second pre-registration, for 6 months commencing 1st January, 1957.

Applications, with copies of 3 testimonials, to be sent to the Administrative Officer of the Hospital.

**MANCHESTER REGIONAL HOSPITAL BOARD** invites applications for the post of MEDICAL REGISTRAR in the Rehabilitation Unit and Department of Physical Medicine at the Devonshire Royal Hospital, Buxton. The post offers excellent opportunity in research and the Hospital is recognised for the Diploma in Physical Medicine. A self-contained, unfurnished flat is available at a rental.

Applications, stating age, experience and qualifications, together with the names of 2 referees, to be forwarded to the undersigned within 10 days of the appearance of this advertisement.

H. G. PRICE, Group Secretary.

59B, Shaw-heath, Stockport, Cheshire.

**MANCHESTER REGIONAL HOSPITAL BOARD.** RESIDENT MEDICAL OFFICER (Registrar grade), post vacant early January at Birch Hill Hospital, Rochdale.

Apply as soon as possible, with names and addresses of 2 referees, to Group Secretary, Central Offices, Birch Hill Hospital, Rochdale.

**MANCHESTER REGIONAL HOSPITAL BOARD** invite applications for the non-resident post of REGISTRAR to the E.N.T. Department of the Stockport and Buxton Hospital Management Committee, vacant on 15th January, 1957. The main duties will be at Stockport Infirmary with some duties at other hospitals in the Group.

Applications, stating age, experience and qualifications together with the names of 2 referees, to be forwarded to the Secretary, Stockport and Buxton Hospital Management Committee, 59B, Shaw-heath, Stockport.

**MANCHESTER (near). ROYAL MANCHESTER CHILDREN'S HOSPITAL, PENDLEBURY,** near MANCHESTER. SALFORD HOSPITAL MANAGEMENT COMMITTEE.

SENIOR HOUSE OFFICER (surgical).
MEDICAL HOUSE OFFICER.
SURGICAL HOUSE OFFICER.

Applications invited for above resident appointments, vacant 1st February, 1957, tenable for 6 months. Candidates for first-named appointment should preferably have had previous pædiatric experience. Latter appointments open to pre-registration graduates.

Applications to Hospital Secretary not later than 11th December, 1956.

**MANCHESTER. UNITED MANCHESTER HOSPITALS.** MANCHESTER ROYAL EYE HOSPITAL. Applications are invited for the post of REGISTRAR at the above Hospital. Whole-time post (non-resident). Tenable for 12 months, subject to renewal. Previous experience in ophthalmology essential. The terms and conditions of service for hospital medical and dental staffs will apply.

Applications to be made as soon as possible on forms obtainable from the undersigned.

H. R. NORTH, General Superintendent.

**MANCHESTER, 20. WITHINGTON HOSPITAL. South** MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (pædiatrics), resident or non-resident, required immediately in the Obstetrical Unit at the above Hospital with over 2000 cases annually. Some sessions may be allocated at the Duchess of York Hospital for Babies and Wythenshawe Hospital which are within the Group.

Applications, with full details, to be forwarded to the Group Secretary, Withington Hospital, within 7 days of the appearance of this advertisement.

**MANCHESTER, 20. WITHINGTON HOSPITAL. South** MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the post of CLINICAL ASSISTANT in the Department of Rheumatic Diseases at Withington Hospital for 2 sessions each week.

Applications, with full details, to be forwarded to the Group Secretary, Withington Hospital, Manchester, 20, within 7 days of the appearance of this advertisement.

**MARGATE. GENERAL HOSPITAL. (132 Beds.) House** PHYSICIAN. Approved pre-registration post. Salary at the rate of £425–£525 p.a. according to experience, less £125 for residential emoluments.

Applications, with copies of testimonials, to Hospital Secretary.

**MAIDENHEAD HOSPITAL, Berkshire. Applications** invited for post of CASUALTY OFFICER, vacant 1st January. Post recognised for F.R.C.S.

Applications, stating age, qualifications, nationality, and experience, with names of 3 referees, to Secretary.

**MAIDENHEAD HOSPITAL, Berkshire. Applications** invited for post of HOUSE SURGEON vacant 14th January. Preference given to persons seeking pre-registration post.

Applications, stating age, nationality and qualifications, with names of 3 referees, to Secretary.

**MAIDSTONE. KENT COUNTY OPHTHALMIC AND** AURAL HOSPITAL. (113 Beds.) MID-KENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of SENIOR HOUSE SURGEON in the Ophthalmic Department of the above Hospital. The Hospital is recognised by the Examining Board for the F.R.C.S. and the D.O. Salary £745 a year, less £150 a year for residential emoluments.

Applications should be forwarded as soon as possible to the Administrative Officer, Kent County Ophthalmic and Aural Hospital, Church-street, Maidstone.

**MAIDSTONE. KENT COUNTY OPHTHALMIC AND** AURAL HOSPITAL. (113 Beds.) MID-KENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of SENIOR HOUSE SURGEON in the E.N.T. Department of the above Hospital. Post vacant mid-December, 1956. There are 55 E.N.T. beds and 6 specialist operating sessions each week. Valuable experience is available, and the post is recognised for the purpose of the F.R.C.S. and the D.L.O. Salary will be £745 a year, less £150 a year for residential emoluments.

Applications to the Administrative Officer, Kent County Ophthalmic and Aural Hospital, Maidstone, Kent.

**NEWCASTLE GENERAL HOSPITAL. (838 Beds.)** NEWCASTLE UPON TYNE HOSPITAL MANAGEMENT COMMITTEE. The following Resident posts become vacant on 7th January, 1957. Undergraduate teaching is conducted in most departments of the Hospital.

*HOUSE PHYSICIANS (4), general medical wards (2 of these posts rotate with the House Physician post in the Cardiovascular Department).

*HOUSE PHYSICIAN (1), Cardiovascular Department (this post rotates with the 2 House Physician posts in general medicine).

HOUSE PHYSICIANS (4), Pædiatrics. Hospital for Sick Children, Newcastle upon Tyne (2), and Children's Department, Newcastle General Hospital (2). (3 of the posts are for pre-registration candidates (medical and surgical).) The posts offer experience in the whole of the pædiatric work of the hospitals, including general medicine and surgery and the special departments. There is a close association with the University Department of Child Health.

*HOUSE PHYSICIAN (1), Geriatric Unit.

*HOUSE SURGEON (2), General Surgery (recognised for the F.R.C.S. Diploma).

*HOUSE SURGEON (1), Accident and Admission Department (recognised for F.R.C.S. Diploma).

*These posts are recognised for the purpose of Pre-registration Service and applications will be accepted from students on the point of taking their qualifying examination.

Applications, together with names and addresses of 2 referees, should be sent to the Secretary, Newcastle General Hospital, Newcastle upon Tyne, 4, by 8th December, 1956.

**NEWCASTLE GENERAL HOSPITAL. (838 Beds.)** NEWCASTLE UPON TYNE HOSPITAL MANAGEMENT COMMITTEE. Cardiology. SENIOR HOUSE OFFICER (resident) required in the Cardiovascular Department. Regional Unit.

Applications, together with the names and addresses of 2 referees, should be sent to the Secretary, Newcastle General Hospital, Westgate-road, Newcastle upon Tyne, 4.

**NEWCASTLE REGIONAL HOSPITAL BOARD. Special** AREA COMMITTEE FOR CUMBERLAND AND NORTH WESTMORLAND. EAST CUMBERLAND GROUP OF HOSPITALS. SURGICAL REGISTRAR (resident), required for 1 year in the first instance with likelihood of extension. Main duties at the Cumberland Infirmary, Carlisle (340 Beds). The post, vacant as from middle/end of January, is recognised under the F.R.C.S. regulations.

Applications, with names and addresses of 3 referees, to the Senior Administrative Medical Officer, 72, Warwick-road, Carlisle, within 14 days.

**NEWCASTLE UPON TYNE HOSPITAL MANAGEMENT** COMMITTEE AND HEXHAM AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. DEPARTMENTS OF OBSTETRICS AND GYNÆCOLOGY. Applications are invited for the following posts, vacant on 7th January, 1957.

(1) **Newcastle General Hospital** (838 Beds)

Department of Obstetrics and Gynæcology (100 Beds). HOUSE SURGEONS (resident), pre-registration (2). This department is recognised for the M.R.C.O.G., and D.Obst. R.C.O.G., and undertakes the training of medical students in the University of Durham. Preference will be given to provisionally registered candidates who have carried out their first house appointment.

(2) **Hexham General Hospital** (314 Beds)

Gynæcology: HOUSE SURGEON (resident), pre-registration. Recognised for M.R.C.O.G. Applications considered from final-year students in anticipation of graduation.

(3) **Dilston Hall Maternity Hospital, Corbridge** (50 Beds)

Obstetrics: HOUSE SURGEON (resident), pre-registration. Recognised for D.Obst.R.C.O.G.

Applications, together with names and addresses of 2 referees, should be sent to the Secretary, Newcastle General Hospital, Westgate-road, Newcastle upon Tyne, 4, by 8th December, 1956.

**NEWCASTLE. THE UNITED NEWCASTLE UPON** TYNE HOSPITALS. Applications are invited for the whole-time non-resident appointment of SENIOR REGISTRAR to the Department of Bacteriology at the Royal Victoria Infirmary. The successful candidate will assist in the general work of the laboratory, including blood-transfusion serology and in the research programme. The appointment will be for 1 year in the first instance and will be subject to terms and conditions of service of hospital medical staff in the National Health Service.

Applications, giving full details and the names and addresses of 3 referees, should be sent to the undersigned within 2 weeks of the appearance of this advertisement.

A. W. SANDERSON, House Governor and Secretary.
Royal Victoria Infirmary, Newcastle upon Tyne.

**NEWMARKET GENERAL HOSPITAL. Applications are** invited for the post of HOUSE PHYSICIAN, vacant 31st December, 1956. Duties include house charge of general medical and pulmonary tuberculosis beds. The post is recognised for pre-registration, is resident and tenable for 6 months. Salary in accordance with national scale.

Applications, together with 3 recent testimonials, to Medical Superintendent.

**NEWMARKET GENERAL HOSPITAL. Applications** are invited for the post of HOUSE SURGEON, vacant 1st January, 1957. Duties include surgical house charge of general surgical, E.N.T., and eye cases. Post resident and available for 6 months, recognised for pre-registration.

Applications, with copies of 3 testimonials, to the Medical Superintendent.

**NORTHAMPTON GENERAL HOSPITAL. (482 Beds.)** Vacancies middle December for HOUSE OFFICER or SENIOR HOUSE OFFICER (Casualty Department), to work in conjunction with Senior Casualty Officer. Recognised for F.R.C.S. and (House Officer) for medical pre-registration. Appointment to 31st March, 1957, in the first instance.

Applications as soon as possible to S. G. HILL, Superintendent.

**NORTHAMPTON GENERAL HOSPITAL. (482 Beds.)** Inquiries are invited concerning ROTATING INTERN posts each of 6 months duration. The posts are normally held for 2 years and there is 1 vacancy from 1st April, 1957, and further vacancies from 1st October, 1957. Junior Hospital Medical Officer salary scale and conditions of service. Single accommodation is available and married men may be able to rent unfurnished flats near the Hospital. The posts are available only to candidates who have completed military service and desire further experience before entering general practice or specialising.

Inquiries should be addressed to S. G. HILL, Superintendent.

**NORTHWOOD, MIDDLESEX. MOUNT VERNON HOS**PITAL. Applications invited for Whole-time SURGICAL REGISTRAR from 1st March, 1957. Required for 1 year in the first instance. Appointment recognised for the Final F.R.C.S. examination. Candidates may visit the Hospital by direct appointment with the Resident Medical Officer.

Application forms obtainable from, and returnable to, the Secretary, Harefield and Northwood Group Hospital Management Committee, Mount Vernon Hospital, Northwood, Middlesex, by 10th December, 1956.

**NOTTINGHAM GENERAL HOSPITAL. 2 Senior House** OFFICERS (orthopædic and fracture) required, one mid-December, one 1st February. The posts offer exceptional experience in traumatic surgery.

Applications, stating age, qualifications and experience, nationality, &c., together with copies of testimonials, to be sent to Group Secretary.

**NOTTINGHAM GENERAL HOSPITAL.** Resident pre-registration or registered HOUSE SURGEON required. Duties to commence on 1st December.

Applications, stating age, qualifications and experience, together with copies of testimonials, to be sent to the Group Secretary.

**NOTTINGHAM GENERAL HOSPITAL.** Senior House OFFICER (anæsthetics) required about 10th January, 1957. The post is recognised for the D.A. and the F.F.A.R.C.S. This is a busy general hospital giving experience in all branches of surgery.

Applications, stating age, nationality, qualifications and experience, together with copies of testimonials, to be sent to the Group Secretary.

**NOTTINGHAM GENERAL HOSPITAL.** Resident pre-registration or registered HOUSE PHYSICIAN required. Duties to commence end of December.

Applications stating age, qualifications and experience, together with copies of testimonials, to be sent to the Group Secretary.

**NOTTINGHAM GENERAL HOSPITAL.** Applications are invited for the post of SENIOR HOUSE OFFICER (casualty), duties to commence 31st January, 1957. Establishment 3. Recognised for F.R.C.S. Post offers wide experience of casualty work.

Applications, stating age, nationality, qualifications, and experience, together with copies of testimonials, to be sent to Secretary, General Hospital, Nottingham.

**NOTTINGHAM CHILDREN'S HOSPITAL. (136 Beds.)** SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time SURGICAL REGISTRAR required. Duties will include work in the Casualty Department. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 10th December, 1956, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

**NOTTINGHAM. CITY HOSPITAL. (811 Beds.)** Applications are invited for the post of HOUSE OFFICER (obstetrics and gynecology) (recognised for pre-registration purposes), which will be graded Senior House Officer or House Officer in accordance with experience. Recognised for the M.R.C.O.G. and D.Obst.R.C.O.G. Post vacant on 16th January, 1957.

Applications, stating age, nationality, qualifications and experience, together with copies of not more than 3 testimonials, to be sent to the Hospital Secretary, City Hospital, Hucknall-road, Nottingham.

**NOTTINGHAM. CITY HOSPITAL. (811 Beds. Recognised for training for the D.A. and F.F.A.R.C.S.)** SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT REGISTRAR (anæsthetics) required. Appointment for 1 year in first instance.

Apply to the Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 10th December, 1956, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

**OXFORD REGIONAL HOSPITAL BOARD.** Registrar in General Surgery at the Northampton General Hospital. The appointment will be for 1 year and eligible for extension to a second year. Accommodation for a single person is available.

Applications on forms obtainable from the Secretary, Registrar Committee, 43, Banbury-road, Oxford, should reach him by 12th December, 1956.

**OXFORD REGIONAL HOSPITAL BOARD. Peppard** CHEST HOSPITAL, near READING, BERKS. (236 Beds.) SENIOR REGISTRAR in Diseases of the Chest. Applicants should have completed 4 years in the grade of Senior Registrar. Resident accommodation available for a single person. The appointment will be for 1 year in the first instance.

Applications on forms obtainable from the Secretary, Oxford Regional Hospital Board, should reach him by 18th December, 1956.

**PLYMOUTH. SOUTH DEVON AND EAST CORNWALL** HOSPITAL, FREEDOM FIELDS. CENTRAL CASUALTY DEPARTMENT. SENIOR HOUSE OFFICER in Casualty, vacant 1st January, 1957. Recognised for the F.R.C.S.

Applications, stating age, nationality, qualifications and experience, with names of 3 referees, to be sent to—

ARTHUR R. CASH, Group Secretary, Plymouth,
South Devon and East Cornwall General Hospital Group.
7, Nelson-gardens, Stoke, Plymouth.

**PLYMOUTH. SOUTH DEVON AND EAST CORNWALL** HOSPITAL.

SENIOR HOUSE OFFICER in Surgery, vacant 1st February, 1957. Recognised for the F.R.C.S. Greenbank Road Section.

HOUSE SURGEON (pre-registration post), vacant immediately. Recognised for the F.R.C.S. Greenbank Road Section.

HOUSE SURGEON (pre-registration post), vacant 1st January, 1957. Recognised for the F.R.C.S. Freedom Fields Section.

Applications, stating age, nationality, qualifications and experience, together with the names and addresses of 3 referees, to be sent to—

ARTHUR R. CASH, Group Secretary, Plymouth,
South Devon and East Cornwall General Hospital Group.
7, Nelson-gardens, Stoke, Plymouth.

**POOLE GENERAL HOSPITAL, Poole, Dorset. Bournemouth** AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. Locum REGISTRAR in Anæsthetics required from 15th December, 1956.

Applications, with testimonials, to Hospital Secretary.

**POOLE GENERAL HOSPITAL, Poole Dorset. Bournemouth** AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON (pre-registration) required. The post, which becomes vacant on 17th December, is recognised for F.R.C.S. and F.R.C.S. Ed.

Applications to the Hospital Secretary.

**PAISLEY INFECTIOUS DISEASES HOSPITAL.** House OFFICERS (pre-registration) required for Fever Unit.

Applications to Group Medical Superintendent, Royal Alexandra Infirmary, Paisley.

**PAISLEY INFECTIOUS DISEASES HOSPITAL.** Junior HOSPITAL MEDICAL OFFICER in Fevers required. Applicants for this post should have been registered medical practitioners for at least 1 year.

Applications to Group Medical Superintendent, Royal Alexandra Infirmary, Paisley.

**PERTH. COUNTY AND CITY OF PERTH GENERAL** HOSPITALS BOARD OF MANAGEMENT. Locum HOUSE OFFICER or SENIOR HOUSE OFFICER required for Gynecology Unit, Bridge of Earn Hospital, from 24th December to 6th January, and for Obstetrics Unit, Perth Royal Infirmary, from 7th January to 20th January. Grade according to experience.

Applications should be sent to the Group Medical Superintendent, Perth Royal Infirmary, Perth.

**READING AND DISTRICT HOSPITAL MANAGEMENT** COMMITTEE. Applications are invited for the post of RESIDENT SENIOR HOUSE OFFICER (Area Accident and Orthopædic Department), vacant mid-December. Recognised for F.R.C.S. Duties including work in area Casualty Department at Battle Hospital, Reading (300 Beds). Person appointed will work with Registrar and House Officers.

Apply, stating nationality, present post and qualifications with dates, together with names of 2 referees, to Group Secretary, 3, Craven-road, Reading.

**READING. BATTLE HOSPITAL. (391 Beds.)** Applications are invited from registered medical practitioners for the post of RESIDENT JUNIOR HOUSE SURGEON (orthopædic) in the Area Accident and Orthopædic Department. Post now vacant. F.R.C.S. recognised. Also casualty duties. Salary £425–£525 p.a., less £150 board-residence.

Apply, stating age, qualifications with dates, nationality, present post, with 1 copy of recent testimonial, to Hospital Secretary.

**READING COMBINED HOSPITALS. Area Department** OF OBSTETRICS AND GYNÆCOLOGY. (100 Beds.) Applications are invited from registered medical practitioners for the resident post of HOUSE SURGEON to the above Department. The appointment, which is vacant on 1st January, 1957, is for 1 year, with 6 months gynecology at the Royal Berkshire Hospital, and 6 months in the Maternity Unit at Battle Hospital. Both appointments are recognised for the Diplomas of the Royal College of Obstetricians and Gynæcologists.

Write, stating age and qualifications with dates, nationality and present appointment, with copy of 1 recent testimonial, to Secretary, Royal Berkshire Hospital, Reading.

**READING. ROYAL BERKSHIRE HOSPITAL.** Applications are invited from registered medical practitioners only for the post of RESIDENT ASSISTANT PATHOLOGIST vacant 6th December and tenable for 6 months. Salary £525 p.a.

Write, stating age, qualifications with dates, nationality, present post, with copy of 1 recent testimonial, to Secretary.

**REDHILL COUNTY HOSPITAL, Earlswood Common,** REDHILL. HOUSE SURGEON (pre- or post-registration) for gynæcological duties, with some relief obstetrics. Recognised for M.R.C.O.G. 6 months appointment, vacant 22nd December.

Apply Group Secretary, Redhill Hospital Management Committee, Earlswood Mount, Redhill, Surrey.

**ROCHDALE AND DISTRICT HOSPITAL MANAGEMENT** COMMITTEE. JUNIOR HOSPITAL MEDICAL OFFICER (orthopædics), required immediately.

Apply at once to Group Secretary, Central Offices, Birch Hill Hospital, Rochdale, Lancs.

**ROCHDALE AND DISTRICT HOSPITAL MANAGEMENT** COMMITTEE. 3 HOUSE PHYSICIANS required (pre-registration candidates eligible) at Birch Hill Hospital, January.

Written applications to be sent as soon as possible to Group Secretary, Central Offices, Birch Hill Hospital, Rochdale, giving names and addresses of 2 referees.

**ROCHDALE INFIRMARY. Senior House Officer (Anæsthetics)** required.

Applications, with names and addresses of 2 referees and full particulars, to Group Secretary, Central Offices, Birch Hill Hospital, Rochdale, Lancs, as soon as possible.

**ROMFORD, ESSEX. OLDCHURCH HOSPITAL. (722** Beds.) SENIOR HOUSE OFFICER (neurosurgery) required from 18th January, 1957. Suitable for candidates seeking higher medical or surgical qualifications. Recognised for the F.R.C.S. (Eng.).

Apply to Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford, as soon as possible.

**SALISBURY GENERAL HOSPITAL. Pædiatric House** OFFICER, Odstock Hospital, 55 medical and surgical beds. Recognised for D.C.H. Vacant 25th January.

Applications, with names and addresses of 2 referees, to Group Secretary, Salisbury Group Hospital Management Committee, Odstock Hospital, Salisbury.

**SALISBURY GENERAL HOSPITAL.** Applications are invited for the appointment of RESIDENT HOUSE SURGEON/HOUSE PHYSICIAN to run consecutively in this order from 1st January, 1957, for a period of 6 months in each post. The post is open to pre-registration candidates.

Apply, naming 2 referees, to Group Secretary, Salisbury Group Hospital Management Committee, Odstock Hospital, Salisbury.

**ST. ALBANS CITY HOSPITAL, St. Albans, Hertfordshire.** (384 Beds.) Locum Tenens JUNIOR HOSPITAL MEDICAL OFFICER (resident) required for the Gynæcological and Obstetric Departments mainly at the above Hospital for the period 21st December, 1956–6th January, 1957.

Applications to Secretary, Mid Herts Group Hospital Management Committee, Bleak House, Catherine-street, St. Albans.

**ST. ALBANS CITY HOSPITAL, St. Albans, Hertfordshire.** (384 Beds.) HOUSE SURGEON (House Officer grade) required for 1 of the 2 general surgical teams. Recognised for F.R.C.S. Post vacant 7th January, 1957, and tenable for 6 months. Preference given to candidates seeking post under the Medical Act, 1950.

Applications to Secretary, Mid Herts Group Hospital Management Committee, Bleak House, Catherine-street, St. Albans.

**ST. HELENS AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE.** Applications are invited for the appointment of CASUALTY OFFICER in the Senior House Officer grade, at Whiston Hospital, Prescot (892 Beds). The post is approved for the 6 months training in casualty work required of candidates for the Fellowship examination of the Royal College of Surgeons.

Applications, stating age, qualifications and experience, and giving 2 names for reference, should be forwarded immediately to N. RICHARDS, Group Secretary.

Whiston Hospital, Prescot.

**SCOTLAND. EASTERN REGIONAL HOSPITAL BOARD.** Radiodiagnosis. DUNDEE TEACHING HOSPITALS. Applications are invited for an appointment as SENIOR REGISTRAR in Radiodiagnosis at Dundee Royal Infirmary (510 Beds) the main general teaching hospital associated with the University of St. Andrews. Possession of the Diploma in Radiology is essential. Salary and conditions of service in accordance with national agreement.

Forms of application and further particulars from the Secretary to the Board, 430, Blackness-road, Dundee, with whom applications must be lodged not later than 22nd December, 1956.

**SCOTLAND. NORTH-EASTERN REGIONAL HOSPITAL BOARD.** Applications are invited for the full-time post of SENIOR REGISTRAR in Psychiatry. Duties are in rotation and will be carried out at the Department of Psychological Medicine, Royal Infirmary, under the Board of Management for the Aberdeen General Hospitals and at Kingseat Hospital, Newmacher, and the Royal Mental Hospital under the Board of Management for the Aberdeen Mental Hospitals. Candidates should have experience in their specialty and preferably hold the appropriate higher qualification.

Applications, giving 2 names for reference, should be submitted by 22nd December, 1956, to the Secretary, 1, Albyn-place, Aberdeen, from whom further particulars may be obtained.

**SCOTLAND. NORTHERN REGIONAL HOSPITAL BOARD.** Applications are invited for a whole-time post of MEDICAL REGISTRAR at the Inverness Hospitals. Main duties are at Raigmore Hospital.

Schedules of application and further particulars are obtainable from the undersigned, to whom applications should be submitted by 22nd December, 1956.

A. M. FRASER, M.D.,
Secretary and Administrative Medical Officer.
Office of the Northern Regional Hospital Board,
Raigmore, Inverness.

**SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD.** Applications are invited for the following appointments, which will be for 1 year in the first instance :—

SENIOR REGISTRAR in Radiotherapy based at the Western Infirmary, Glasgow.

REGISTRAR in Surgery based at the Royal Infirmary, Glasgow.

These appointments are subject to the National Health Service (Scotland) superannuation regulations.

Applications (12 copies), stating date of birth, qualifications, experience, present appointment, and the names of 3 referees, to reach the Secretary, Western Regional Hospital Board, 64, West Regent-street, Glasgow, C.2, by 15th December, 1956.

**SHEFFIELD REGIONAL HOSPITAL BOARD. Sheffield NATIONAL CENTRE FOR RADIOTHERAPY.** Whole-time NON-RESIDENT SENIOR REGISTRAR required. Candidates should possess the Diploma in Radiotherapy or a higher qualification in medicine or surgery. Duties mainly in Sheffield but there may be occasional duties at associated Centres in the Region. Appointment for 1 year in first instance, reviewable annually.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 17th December, 1956, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

**SHEFFIELD. THE UNITED SHEFFIELD HOSPITALS.** Applications invited for the following posts :—

**Royal Infirmary Unit**

NON-RESIDENT or RESIDENT REGISTRAR in the Orthopædic and Accident Department at the above Hospital. Post recognised for Casualty requirements for the Final F.R.C.S.

Closing date for applications 10th December.

**Royal Hospital Unit**

REGISTRAR in General Medicine required at the above Hospital.

Closing date for applications 12th December, 1956.

Applications for the above posts should state age, qualifications, and experience, give the names of 3 referees, and be sent to the Chief Administrative Officer, The United Sheffield Hospitals, West-street, Sheffield, 1.

**SOUTHAMPTON EYE HOSPITAL. (32 Beds. Recognised** for D.O. examination.) RESIDENT SENIOR HOUSE OFFICER required end December.

Applications, with copies of testimonials, should be forwarded as soon as possible to Secretary, Southampton Group Hospital Management Committee, Bullar-street.

**SOUTHAMPTON GENERAL HOSPITAL. (472 Beds.)** RESIDENT HOUSE SURGEON required mid-December. Pre-registration candidates eligible.

Applications, with copies of recent testimonials, should be forwarded to Group Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

**SOUTHAMPTON. ROYAL SOUTH HANTS HOSPITAL** (274 Beds) and SOUTHAMPTON GENERAL HOSPITAL (472 Beds). SENIOR HOUSE OFFICER (E.N.T.) required. This post is recognised for the F.R.C.S. (Eng.) and D.L.O. examinations and provides experience in all branches of E.N.T. work. The Group includes a diagnostic and distributing Hearing Aid Centre.

Applications, with copies of recent testimonials, should be forwarded as soon as possible, to the Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

**SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD.** Applications are invited for 2 appointments as Whole-time REGISTRARS in Psychiatry to fill vacancies in the approved trainee establishment at Oakwood Hospital, Maidstone, Kent. Previous experience in general medicine is desirable. The appointments will be in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales), and will be for 1 year in the first instance.

Applications, giving particulars of age, qualifications and experience with relevant dates, together with the names and addresses of 2 referees, to be sent to the Secretary, Registrars Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, London, W.1, not later than 15th December, 1956.

**SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD.** Applications are invited for a whole-time appointment as RESIDENT SURGICAL OFFICER to fill a vacancy in the approved establishment at the Isle of Thanet Group of hospitals available on 1st February, 1957. This appointment includes, in addition, duties connected with urological surgery. The salary will be £965 p.a. and the appointment will be in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales), and will be for 1 year in the first instance, renewable for a further year.

Applications, giving particulars of age, qualifications and experience with relevant dates, together with the names and addresses of 2 referees, to be sent to the Secretary, Registrars Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, W.1, not later than 15th December, 1956.

**SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD** requires Whole-time JUNIOR HOSPITAL MEDICAL OFFICER for the Blood Transfusion Service in the South West and South East Metropolitan Regions. Duties will be divided between blood collections from donors in the area covered by the South West and South East Metropolitan Regional Hospital Boards and laboratory work, including research, at the South London Blood Transfusion Centre, Stanley-road, Sutton, Surrey. The appointments offer ample scope in serology and hæmatology and all aspects of blood transfusion. Salary scale £775–£50–£1075 p.a.

Applications by letter (2 copies), giving date of birth, qualifications, experience and names of 3 referees, to Secretary (S.1), South West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, by 15th December, 1956. Applicants may visit Blood Transfusion Centre by arrangement with the Medical Director there.

**SHREWSBURY. ROYAL SALOP INFIRMARY. (216** Beds.) HOUSE SURGEON, vacant 16th January, 1957. Pre-registration candidates eligible. Recognised for the F.R.C.S.

Applications, with copy testimonials, to Group Secretary, Shrewsbury Hospital Group, Royal Salop Infirmary, Shrewsbury.

**SHREWSBURY. ROYAL SALOP INFIRMARY/COPTHORNE HOSPITAL.** (500 Beds.) HOUSE PHYSICIAN (pre-registration or otherwise), vacant 19th January, 1957.

Applications, with copy testimonials, to Group Secretary, Royal Salop Infirmary, Shrewsbury.

**SKIPTON (near). GRASSINGTON HOSPITAL. (208** Beds.) JUNIOR HOSPITAL MEDICAL OFFICER required for the above Hospital, which provides treatment for tuberculosis patients, men and women. Accommodation available for single applicants.

Applications to Medical Superintendent.

**SKIPTON (near). GRASSINGTON HOSPITAL. (208** Beds.) SENIOR HOUSE OFFICER required for the above Hospital, which provides treatment for tuberculosis patients, men and women. Accommodation available for single applicants.

Applications to Medical Superintendent.

**STOCKTON-ON-TEES. SEDGEFIELD GENERAL HOSPITAL. SEDGEFIELD HOSPITAL MANAGEMENT COMMITTEE.** Applications are invited for the appointment of SENIOR HOUSE OFFICER (orthopædics). Full Consultant staff employed; post recognised in connection with F.R.C.S. examinations; modern self-contained furnished flat available at low rental.

Applications to the undersigned immediately.

L. WATSON, Group Secretary.

**STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY.** HOUSE PHYSICIAN (general medicine) with Dermatology. Pre-registration post.

Detailed applications, with copy testimonials, to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

**STOKE-ON-TRENT HOSPITAL MANAGEMENT COMMITTEE.** Appointment of RESIDENT ASSISTANT CLINICAL PATHOLOGIST to the Stoke-on-Trent Group of hospitals, vacant December. Single accommodation at North Staffs. Royal Infirmary. The post is Junior Hospital Medical Officer status, but applicants with less than 2 years qualification period will be considered in the grade of Senior House Officer. Exceptional experience in hospital laboratory work. Recognised for D.C.P. and Diploma in Pathology.

Detailed applications with particulars of previous appointments held (3 testimonials) to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent, as soon as possible.

**STAFFORD. STAFFORDSHIRE GENERAL INFIRMARY.** (175 Beds—Recovery Unit 32 Beds.) HOUSE SURGEON (pre-registration post), vacant 26th December. At end of term of service the successful applicant will be considered for appointment to a pre-registration post of House Physician if he or she has not held such an appointment.

Applications to Group Secretary, Stafford Hospital Management Committee, 13, Foregate-street, Stafford.

**STAFFORD. STAFFORDSHIRE GENERAL INFIRMARY.** (175 Beds—Recovery Unit 32 Beds.) HOUSE PHYSICIAN (pre-registration post), vacant 10th January. At end of term of service the successful applicant will be considered for appointment to a pre-registration post of House Surgeon if he or she has not held such an appointment.

Applications to Group Secretary, Stafford Hospital Management Committee, 13, Foregate-street, Stafford.

**SUNDERLAND AREA HOSPITAL MANAGEMENT COMMITTEE.** RESIDENT ANÆSTHETIST is required for duties at hospitals in the above Group. Senior House Officer grade. Post vacant December. The post offers good practical experience under the supervision of the visiting Anæsthetists. The hospitals are recognised for the F.F.A.R.C.S. and the D.A. In addition every opportunity is given to attend lectures at the neighbouring University 12 miles away.

Apply to the Group Secretary, Sunderland Area Hospital Management Committee, General Hospital, Sunderland, naming 2 referees.

**SUNDERLAND. THE ROYAL INFIRMARY. The CASUALTY DEPARTMENT.** A vacancy will occur 1st January, 1957, for a CASUALTY OFFICER (Senior House Officer grade). The Casualty Officer is to take charge of the Casualty Department under the direct supervision of a Senior Surgeon. This post is recognised for the F.R.C.S.

Applications, with names of 2 referees, to the Hospital Secretary, Royal Infirmary, Sunderland.

**TAPLOW, near MAIDENHEAD. CANADIAN RED CROSS MEMORIAL HOSPITAL.** RESIDENT ANÆSTHETIC REGISTRAR required. Post recognised for F.F.A.R.C.S.

Application forms obtainable from, and returnable to, Secretary, Windsor Group Hospital Management Committee, Almaroad, Windsor, by 9th December.

**TAPLOW, near MAIDENHEAD. CANADIAN RED CROSS MEMORIAL HOSPITAL.** SENIOR HOUSE OFFICER required to Special Unit for Juvenile Rheumatism. Post offers scope for those interested in research, pædiatrics, rheumatology or cardiology, and previous experience in 1 of these is desirable. Post vacant 1st December and tenable for 6 months in the first instance.

Applications, stating age, qualifications, experience, with dates, together with copies of 3 testimonials, to Secretary.

**TAPLOW, near MAIDENHEAD. CANADIAN RED CROSS MEMORIAL HOSPITAL.** HOUSE PHYSICIAN required to Special Unit for Research in Juvenile Rheumatism, vacant 4th January. Post offers scope for those interested in research, pædiatrics, rheumatology or cardiology.

Applications, stating age, qualifications and experience, with dates, with copies of 2 testimonials, to Secretary.

**TAUNTON AND SOMERSET HOSPITAL. Applications** are invited for HOUSE OFFICER (general surgery). Post vacant mid-January, 1957. Recognised for pre-registration candidates and F.R.C.S.

Applications, stating age, nationality, and qualifications, together with the names of 2 referees, should be forwarded to the Group Secretary, Taunton Hospital Management Committee, Musgrove Park Hospital, Taunton, Somerset.

**TAUNTON AND SOMERSET HOSPITAL. Applications** are invited for HOUSE OFFICER (E.N.T.). Post now vacant. Post-registration appointment, recognised for F.R.C.S. and D.L.O.

Applications, stating age, nationality, and qualifications together with the names of 2 referees, should be forwarded immediately to the Group Secretary, Taunton Hospital Management Committee, Taunton and Somerset Hospital, Musgrove Park Branch, Taunton, Somerset.

**TORQUAY. TORBAY HOSPITAL. (166 general beds.)** RESIDENT HOUSE OFFICER (surgical), Male or Female, required approximately middle January, 1957. Post recognised for F.R.C.S. and pre-registration purposes. There is a complement of 6 Resident House Officers.

Applications, stating qualifications, nationality, and age, together with copy testimonials (quoting reference F.955/74) to the Group Secretary, Torquay District Hospital Management Committee, Torbay Hospital, Torquay, S. Devon.

**WARWICK HOSPITAL. (264 Beds.) Resident Pædiatric** HOUSE PHYSICIAN required early January. 30-Bedded Pædiatric Unit. Post recognised for D.C.H. and pre-registration.

Applications, with 2 recent testimonials, to Medical Superintendent.

**WIGAN. ROYAL ALBERT EDWARD INFIRMARY.** RESIDENT SURGICAL REGISTRAR required at above Infirmary, vacant 1st January, 1957. Preference given to holders of higher surgical qualifications. Post recognised for F.R.C.S.

Apply, with names of 2 referees, to Secretary, Wigan and Leigh Hospital Management Committee, Knowsley House, Wigan.

**WINCHESTER GROUP HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD.** REGISTRAR in Anæsthetics (Registrar grade) required at the Royal Hampshire County Hospital, Winchester, with duties at Alton General and Lord Mayor Treloar Hospitals. Post recognised for the F.F.A.R.C.S., and is preferably resident. Vacant 1st February.

Forms of application obtainable from Group Secretary, Royal Hampshire County Hospital, Winchester, must be completed and returned within 14 days of appearance of this advertisement.

**WORCESTER. RONKSWOOD HOSPITAL.** House SURGEON (pre-registration or otherwise) required end of December. Post recognised for F.R.C.S. examinations.

Applications to Hospital Secretary.

**WOKING AND CHERTSEY GROUP HOSPITAL MANAGEMENT COMMITTEE.** GYNÆCOLOGICAL REGISTRAR required as soon as possible for duty in above Group of hospitals based on St. Peter's Hospital, Chertsey—total of about 40 gynæcological beds; also to assist at Maternity Units as required. Further information about this new post may be obtained from the Consultant Gynæcologist at St. Peter's Hospital (Phone Ottershaw 441).

Application forms available from Group Secretary, "Huntington," Guildford-road, Chertsey, Surrey, to whom they should be returned by 15th December.

**WOLVERHAMPTON AND MIDLAND COUNTIES EYE INFIRMARY.** SENIOR HOUSE OFFICER required for mid-December. 100 Beds and large Outpatient Department. Recognised for F.R.C.S. and D.O.M.S. examinations.

Applications to Secretary, Eye Infirmary, Compton-road, Wolverhampton.

**WOLVERHAMPTON. NEW CROSS HOSPITAL. Senior** HOUSE OFFICER required as sole resident for 45 obstetric beds. Post recognised for D.Obst.R.C.O.G. Married quarters available.

Applications to Secretary.

**WOLVERHAMPTON. THE ROYAL HOSPITAL. Senior** HOUSE OFFICER (anæsthetics). Post vacant 16th January, 1957. Recognised for D.A. and F.F.A.R.C.S.

Apply Secretary with copies of testimonials.

**WOLVERHAMPTON. THE ROYAL HOSPITAL. (An** Associated Hospital of the University of Birmingham Medical School.) Pre-registration HOUSE OFFICERS.

Vacancies in Medicine occur on 12th December, 1956, 17th January, 1957, and 21st January, 1957.

Vacancies in Surgery occur 5th December, 1956, 9th January, 1957, 14th January, 1957, and 26th January, 1957.

Vacancy in Pædiatrics occurs 16th January, 1957.

Applications, with copies of testimonials, to the Secretary.

**WORTHING HOSPITAL, Lyndhurst-road, Worthing, SUSSEX.** (210 Beds—acute general.) The vacancy of HOUSE SURGEON will occur on 1st January, 1957.

Applications from either registered medical practitioners or pre-registration candidates, stating age, qualifications, experience, nationality and enclosing copies of 2 recent testimonials, to be forwarded to the Hospital Secretary as soon as possible.

A. V. OAKTON, Group Secretary,
Worthing Group Hospital Management Committee.

**WORTHING HOSPITAL, Lyndhurst-road, Worthing, SUSSEX.** (210 Beds—acute general.) The vacancy of HOUSE PHYSICIAN will occur on 1st January, 1957.

Applications from either registered medical practitioners or pre-registration candidates, stating age, qualifications, experience, nationality and enclosing copies of 2 recent testimonials, to be forwarded to the Hospital Secretary as soon as possible.

A. V. OAKTON, Group Secretary,
Worthing Group Hospital Management Committee.

**NEW YORK. NEW ROCHELLE HOSPITAL, New ROCHELLE, NEW YORK, U.S.A.** (360-Bed general community hospital.) Approved by the Joint Commission on Accreditation of Hospitals. Also approved by the American College of Surgeons and American Medical Association for Interneship and Residency training. Only graduates from approved university schools accepted. INTERNESHIPS available for the 1 year term commencing 1st July, 1957. Stipend is $200 per month plus complete maintenance. Passage back to England paid by Hospital after completion of 12-month Interneship.

Apply Superintendent.

**IBADAN, NIGERIA. UNIVERSITY COLLEGE HOSPITAL.**

(*a*) 2 REGISTRARS (Department of Medicine).
(*b*) REGISTRAR (Department of Surgery).
(*c*) REGISTRAR (Department of Anæsthetics).

The Board of Management invite applications from experienced medical practitioners for the above appointments as Registrars in the almost completed teaching hospital which, it is anticipated will be functioning early in the new year. Applicants for the post (*c*) should have had experience in modern anæsthesia. The salary offered for the posts is, in all cases, £1164 p.a., plus an inducement allowance for expatriate officers of £270 p.a. The appointments will be initially for 1 tour of 12 months and will be renewable by mutual agreement for a further tour of 12 months at a salary of £1212 p.a. On satisfactory completion of the agreement a gratuity of £37 10s. will be paid for each completed period of 3 months service. An outfit allowance of £60 is payable on first appointment. Partly furnished quarters are provided at a rental of 8⅓% of salary, excluding inducement allowance. A Nigerian officer will be eligible for 5 days leave on full pay for each completed month of service in Nigeria and an expatriate officer will be eligible for 7 days for each completed month. Free first-class passages to and from Nigeria are provided for expatriate doctors and their wives on first appointment, vacation leave and on completion of agreement. Free first-class passages to Nigeria will, in certain circumstances, be provided for non-expatriate doctors. Candidates will be eligible for children's allowances in accordance with existing regulations. Arrangements can be made to enable doctors to continue their National Health Service superannuation scheme contributions, and details of the revised salary and gratuity payable in such cases will accompany application forms.

Applications should be submitted not later than 14th December, on the appropriate forms, which will be forwarded, together with further information, on receipt of an addressed foolscap envelope, by the Adviser on Staff Recruitment, London Office, University College Hospital, Ibadan, 57, Catherine-place, London, S.W.1.

**IBADAN, NIGERIA. UNIVERSITY COLLEGE HOSPITAL.** The Board of Management invites applications for the following appointments which will become vacant on or shortly after 1st February, 1957.

HOUSE OFFICERS (6 vacancies).

Candidates must be fully registered medical practitioners and must be prepared to serve in any of the following Departments: Medicine, Surgery, Obstetrics or Pædiatrics; but individual preference will be observed as far as possible. The duration of the appointments will be for 1 year, 6 months to be spent in each of 2 departments.

HOUSE OFFICERS (5 vacancies).

Candidates must be provisionally registered practitioners and must be prepared to serve in any of the following Departments: Medicine, Surgery or Obstetrics; as far as possible preferences will be observed. The duration of the appointments will be for 12 months (2 departments) or 6 months in the case of an Officer who has already completed 6 months pre-registration appointment.

Salaries:

House Officers: £972 p.a., plus inducement addition of £240 p.a. for Expatriate Officers.

Gratuity: On satisfactory completion of agreement, a gratuity of £37 10s. will be paid for each completed period of 3 months service where salary and inducement addition exceed £1000, or £25 per quarter where no inducement allowance is payable.

House Officers (pre-registration): £660 p.a., plus inducement addition of £180 p.a. for Expatriate Officers.

Outfit allowance: £60 payable on first appointment unless the candidate has previously received such an allowance.

Quarters: Partly furnished quarters are provided at a rental of 8½% of salary excluding inducement addition. Candidates may be expected to share quarters, in which event half rent would be payable.

Leave: Leave will be granted on full salary at the rate of 5 days (or 7 days in the case of Expatriate Officers) for each month of service in Nigeria on satisfactory completion of contract.

Passages: Free first-class passages to and from Nigeria are provided for Expatriate Officers and their wives. Free first-class passages to Nigeria will, under certain circumstances, be provided for non-expatriate officers and their wives.

Superannuation: Arrangements have been made to enable Expatriate Officers to continue their National Health Service superannuation scheme contributions, and details of the revised salary and gratuity payable in each case will accompany application forms.

Applications should be submitted not later than 14th December, 1956, on the appropriate forms, which can be obtained from the Adviser on Staff Recruitment, London Office, University College Hospital, Ibadan, 57, Catherine-place, London, S.W.1, together with further particulars, on receipt of an addressed foolscap envelope.

**IBADAN, NIGERIA. UNIVERSITY COLLEGE HOSPITAL.** The Board of Management invite applications for the post of HOUSE OFFICER (Department of Anæsthetics) in the almost completed teaching hospital which, it is anticipated will be functioning early in the new year. Candidates must have completed 1 appointment as a House Physician and 1 appointment as a House Surgeon in either surgery or obstetrics and gynæcology. The successful candidate will be required to assume duty early in February, 1957. The salary offered for the post is £972 p.a. plus an inducement allowance for expatriate officer of £240 p.a. The appointment will be initially for 1 tour of 12 months and will be renewable by mutual consent for a further period of 12 months. On satisfactory completion of the agreement a gratuity of £37 10s. will be paid for each completed period of 3 months service. An outfit allowance of £60 is payable on first appointment. Partly furnished quarters are provided at a rental of 8½% of salary, excluding inducement allowance. A Nigerian officer will be eligible for 5 days leave on full pay for each completed month of service in Nigeria and an expatriate officer will be eligible for 7 days for each completed month. Free first-class passages to and from Nigeria are provided for expatriate doctors and their wives on first appointment, vacation leave and on completion of agreement. Free first-class passages to Nigeria will, in certain circumstances, be provided for non-expatriate doctors. Candidates will be eligible for children's allowances in accordance with existing regulations. Arrangements can be made to enable doctors to continue their National Health Service superannuation scheme contributions, and details of the revised salary and gratuity payable in such cases will accompany application forms.

Applications should be submitted not later than 14th December, 1956, on the appropriate forms, which will be forwarded, together with further information, on receipt of an addressed foolscap envelope, by the Adviser on Staff Recruitment, London Office, University College Hospital, Ibadan, 57, Catherine-place, London, S.W.1.

**B.W.I. UNIVERSITY COLLEGE HOSPITAL OF THE WEST INDIES.** Applications are invited for the post of REGISTRAR in the Department of Diagnostic Radiology, vacant April, 1957, at the above-named teaching Hospital which is in special relationship with the University of London. Preference will be given to candidates holding a Diploma in Diagnostic Radiology. The appointment will be for 1 year in the first instance, subject to renewal. Salary will be in the scale £900–£100–£1100: £1200–£100–£1500 p.a., depending on experience and qualifications. Single accommodation and board are provided at a deduction from salary of £145 p.a. or, if available, an unfurnished flat may be provided at 5% of salary. Return passages by sea will be paid for 1 person only.

Further information may be obtained from the Hospital Manager and Secretary, University College Hospital, Mona P.O., Jamaica, B.W.I., to whom applications stating age, nationality, qualifications, and details of previous experience, together with 3 recent testimonials or the names and addresses of 3 referees and including the date on which the candidate would be available, should be sent by 31st December, 1956.

## Public Appointments

**BRIGHTON. COUNTY BOROUGH OF BRIGHTON.** Applications are invited from registered medical practitioners for the whole-time appointment of DEPUTY MEDICAL OFFICER OF HEALTH AND DEPUTY PRINCIPAL SCHOOL MEDICAL OFFICER. Applicants must possess the D.P.H. or its equivalent, be under 45 years of age, and have had administrative and practical experience in the Public Health Service, including experience in the ascertainment of educationally subnormal children. Salary of £1685 rising by 2 annual increments of £105 and 1 of £55 to £1950 p.a.

Application forms may be obtained from the Town Clerk, Town Hall, Brighton, 1, and the completed forms should be returned to me by 17th December, 1956. Canvassing in any form will disqualify. W. O. DODD, Town Clerk.

**GOLD COAST. Medical Officer required at West African** Cocoa Research Institute to take medical care of large cocoa research station, and supervise general sanitation and health measures in station. Well-equipped dispensary provided but no hospital accommodation. Experience in general and tropical medicine and public health desirable. Appointment on contract for 2 tours of duty of from 18 to 24 months each in first instance with gratuity on satisfactory completion of service. Salary scale £1330–£2310 a year. Gratuity (taxable) payable at rate of £12 10s. for each completed month of service. Candidate from the National Health Service may retain his superannuation rights (up to maximum stay of 6 years). Salary in this case would be in scale £1055–£1850 a year, and gratuity 20% of aggregate of salary. Temporary addition of £29 15s. a year also payable. Starting point in both salary scales is determined according to qualifications and experience. Quarters at low rental; income-tax at local rates; free passages for Officer, wife, and up to 3 children under 13 years of age. Generous home leave.

Application forms from Director of Recruitment, Colonial Office, London, S.W.1 (quoting No. BCD. 197/200/015).

**GOVERNMENT OF MAURITIUS. Assistant Radiologist** required for therapeutic and diagnostic work and such other duties required by Director of Medical Services. Candidates must have qualifications registrable in United Kingdom. Experience in radiodiagnosis and radiotherapy an added recommendation. Appointment on contract for 3 years with gratuity (taxable) from £37 10s. to £50 a quarter payable on satisfactory completion of contract. Salary scale Rs. 10,740–Rs. 19,020 (£805 10s.–£1426 10s.) a year. Temporary cost-of-living allowance also payable amounting to 14% of salary up to Rs. 12,000 (£900) a year and 9% on salary over Rs. 12,000 a year. Officers not allocated Government quarters may be reimbursed difference between approved rent paid for a furnished private house (subject to a minimum of Rs. 300 (£22 10s.) a month) and the 10% of salary normally paid for a Government house. Officers in hotels or boarding houses regarded as paying rent for first 21 days at one half and thereafter one quarter of board and lodging charge for themselves and their wives. Income-tax at local rates. Free passages for Officer, wife, and children not exceeding 5 persons in all. Generous leave.

Application forms from Director of Recruitment, Colonial Office, London, S.W.1 (quoting No. BCD.117/52/016).

**GOVERNMENT OF SINGAPORE. Radiologist (Therapy)** required to take charge of Radiotherapy Department and any other duties allotted by the Chief Medical Officer. Candidates must possess qualifications registrable in United Kingdom, the D.M.R.T. and have 10 years post-registration experience including 5 in Radiotherapy. Appointment on contract for 3 years resident service. Basic salary £2128 p.a. Expatriation pay £350 p.a. and temporary variable allowance of £210 p.a. for single officers, £392 for married officers without dependent children and £560 p.a. for officers with dependent children. A gratuity (taxable) is also payable after satisfactory completion of contract of £450 p.a. Special arrangements can be made for candidate from National Health Service who wishes to retain his superannuation rights. European children do well up to the age of about 6 in Singapore and schools are available locally. Income-tax at local rates. Government quarters if available at rental of from $161 to $224 p.a., or allowance in lieu. Free passages for Officer, wife, and children under the age of 10 (not exceeding 4 persons besides himself). Generous leave.

Application forms from the Director of Recruitment, Colonial Office, London, S.W.1 (quoting No. BCD. 117/25/09).

**HER MAJESTY'S OVERSEA SERVICE. Sierra Leone.** MEDICAL OFFICER required for general duties. Must possess medical qualifications and have had at least 12 months post-graduate hospital experience.

Appointment may be:—

(*a*) On 3 years probation for permanent and pensionable employment with pension (non-contributory) at rate of 1/600th of final pensionable emoluments for each completed month of reckonable service.

(*b*) From the National Health Service. Candidate may retain superannuation rights up to 6 years, and receive a gratuity (taxable) of 20% of aggregate of salary.

(*c*) Short-term contract (2 tours each of 18–24 months duration), with gratuity (taxable) of £37 10s. for each completed period of 3 months service (including leave), payable on satisfactory completion of appointment.

Inclusive salary scale under (*a*) and (*b*) £1098–£1956 a year, and under (*c*) £1185–£2117. Starting salary determined by age, qualifications and experience.

Quarters normally available at low rental. Return sea passages for Officer, wife, and up to 2 children under 19 years of age or an allowance in lieu if children are maintained outside Sierra Leone for the whole of the tour. Income-tax at local rates. Local leave permissible and generous home leave granted after each tour.

Application forms from Director of Recruitment, Colonial Office, London, S.W.1 (quoting No. BCD. 117/15/02).

**HER MAJESTY'S OVERSEA SERVICE. Kenya. Medical** OFFICERS with qualifications registrable in United Kingdom required for general duties. Successful candidates may be posted to any station in Kenya. During earlier years of service an officer will be expected to carry out general medical and surgical duties including varying amount of public-health administration. In most stations, even if remote from the larger towns, it is possible to maintain interest in any particular branch of medicine or surgery, to which the officer is attracted. The work of every medical officer is based on a hospital which may vary in size and facilities from small district hospital, meeting needs of comparatively primitive community, to large and modern provincial hospital. Appointments can be made on permanent basis with pension (non-contributory), or on short-term contract with gratuity (taxable) payable on satisfactory completion of service. Normal retiring age is 55. Salary ranges from £1284 to £2115 a year, starting point determined by experience. 4 extra increments given to successful candidates possessing the F.R.C.S., M.R.C.P., D.P.H., or other approved higher qualifications. Permanent Medical Officers are eligible to be considered at any time for promotion to super-scale posts in Kenya and other territories in medical administrations or, if they possess higher qualification and suitable experience, in specialist posts. Quarters at rental varying from £30 to £78 a year according to size and type, and furniture at rate varying from £15 to £36 a year. Free passages in both directions for Officer and wife and up to cost of 1 adult fare for children. Taxation at local rates. Annual local leave permissible and generous home leave granted after each tour of from 24 to 45 months. Educational facilities available.

Application forms from Director of Recruitment, Colonial Office, Great Smith-street, London, S.W.1 (quoting No. BCD. 117/7/02).

**NORFOLK. COUNTY OF NORFOLK.** The Norfolk County Council and the County District Councils concerned invite applications from registered medical practitioners holding the Diploma in Public Health for the whole-time appointment of ASSISTANT COUNTY MEDICAL OFFICER AND DISTRICT MEDICAL OFFICER OF HEALTH for Area No. 7 comprising Downham Market Urban District, Downham Rural District and Marshland Rural District with a total population of approximately 43,000. The person appointed will be employed for seven-elevenths of his time as Assistant County Medical Officer and four-elevenths as District Medical Officer of Health. He will act as an Assistant County Medical Officer under the direction of the County Medical Officer and as District Medical Officer of Health he will be subject to the instructions of the District Councils concerned. The combined salary scale will be £1646 rising to a maximum of £1917 p.a. Travelling and subsistence expenses will be paid in accordance with the County Council's scales.

Application forms together with further particulars of the appointment, can be obtained from the County Medical Officer, 29, Thorpe-road, Norwich, to whom completed application forms should be returned not later than 19th December, 1956.

**STAFFORDSHIRE COUNTY COUNCIL. Appointment** of ASSISTANT COUNTY MEDICAL OFFICER AND SCHOOL MEDICAL OFFICER, South Staffs Area. Applications are invited from fully qualified medical practitioners and those holding the Diploma of Public Health will be given preference. The candidate appointed will undertake clinical work in the School Health and Child Welfare Services under the direction of the County Medical Officer of Health, and will be required to perform such other duties as may from time to time be prescribed. The salary scale is £1050–£50–£1200–£55–£1475, and increments may be given for previous similar service. The appointment will be terminable by 3 months notice in writing on either side and subject to the provisions of the appropriate Superannuation Acts and Regulations, in which connection the selected candidate must pass a medical examination and submit his or her birth certificate.

Forms of application may be obtained from the County Medical Officer, County Buildings, Stafford, to whom they should be returned when completed not later than by 15th December, 1956. T. H. EVANS, Clerk of the County Council.

County Buildings, Stafford, 15th November, 1956.

**TREASURY MEDICAL SERVICE. Applications are** invited from medical practitioners, practising in the districts detailed below, for appointment, in a part-time and mainly advisory capacity, as LOCAL TREASURY MEDICAL OFFICER for each of the places or groups of places shown. The town shown in brackets after the place-names indicates the Head Post Office Area in which the place, or group of places, is situated. Successful applicants will be required to examine and report on the condition of certain Government Officers, teachers, candidates for appointment, &c., who may be referred to them from time to time; and to attend when summoned to an emergency case of accident or sudden illness occurring in a Government office in the neighbourhood. Fees for this work, and mileage allowance where necessary, will be paid on a scale agreed with the British Medical Association.

Intending applicants should write, within 14 days, to Treasury Medical Adviser, Treasury Chambers, Whitehall, S.W.1, for a form on which application may be made. Applicants should be not more than 60 years of age.

The places for which applications are invited are as follows :—

ENGLAND AND WALES

Westminster (London, S.W.1).
Boston (Boston).
Totton (Southampton).
Horndean (Portsmouth).
Abbeytown and Silloth (Carlisle).

SCOTLAND

Burghead and Hopeman (Elgin).
Cambuslang (Glasgow).

NORTHERN IRELAND

Florencecourt and Letterbreen (Enniskillen).

**DERBYSHIRE COUNTY COUNCIL. County Health** DEPARTMENT. ASSISTANT MATERNITY AND CHILD WELFARE MEDICAL OFFICERS AND SCHOOL MEDICAL OFFICERS. Applications are invited from registered medical practitioners for a whole-time superannuable post. Salary £1050–£50–£1200–£55–£1475 p.a. Car allowance.

Particulars and forms of application are obtainable from Dr. J. B. S. MORGAN, County Medical Officer, St. Mary's-gate, Derby, to whom they should be returned by 14th December, 1956.

**DURHAM COUNTY COUNCIL. Applications invited** from registered medical practitioners (Men and Women) for appointment as SCHOOL MEDICAL OFFICER. Applicants must have had at least 3 years experience in the practice of their profession. Salary scale £1050–£50–£1200–£55–£1475 p.a.

Further details and form of application from undersigned. Completed applications by 3rd December, 1956.

G. H. METCALFE, Director of Education.

Shire Hall, Durham, 15th November, 1956.

**MANCHESTER. CITY OF MANCHESTER. Health** DEPARTMENT. MEDICAL OFFICER required for administrative and clinical public-health work. Salary £1050–£1475.

Application forms, to be returned by 8th December, 1956, from the Town Clerk, Town Hall, Manchester, 2.

**STOKE-ON-TRENT. CITY OF STOKE-ON-TRENT.** Appointment of ASSISTANT MEDICAL OFFICER OF HEALTH. Applications are invited from qualified medical practitioners (Women) for the post of Assistant Medical Officer on the Maternity and Child Welfare Services. Candidates should have experience in diseases of children and obstetrics. Opportunity will be given for hospital contact with paediatrics and obstetrics. The possession of a D.P.H. or D.C.H. will be considered an additional qualification. The salary will be in accordance with the Whitley Council scale with commencing salary according to experience. The appointment will be subject to the provision of the National Health Services (Superannuation) Regulations, 1947, and the successful candidate will be required to pass a medical examination.

Forms of application may be obtained from the Medical Officer of Health, Public Health Department, Glebe-street, Stoke-on-Trent, and should be returned, accompanied by copies of not more than 3 recent testimonials, as soon as possible.

HARRY TAYLOR, Town Clerk.

## General Practice

***For an Executive Council post (England and Wales) apply on form E.C.16A obtainable from the council. Mark envelope "Vacancy."***

**SUTTON AND CHEAM, SURREY (NORTH CHEAM).** Applications invited for VACANCY due to death in above borough (intermediate). List about 1000. Deceased doctor's residence and surgery not available. Applications on Form E.C.16A to reach the undersigned not later than 10th December, 1956. S. H. BENNETT, Clerk of the Council.

187, Ewell-road, Surbiton.

## Miscellaneous

**A Civil Engineering Company wishes to appoint a Medical** Officer for a period of 3–4 years. The work is about 20 miles rom Central London and would suit a retired R.A.M.C. or I.M.S. officer. Commenc ng salary not less than £1400 p.a.—Apply in writing with short description of experience, age, qualifications, &c., to EDMUND NUTTALL, SONS & CO. (LONDON) LTD., 22, Grosvenor-gardens, S.W.1.

**Medical Officer-in-Charge. Doctor, who must be a Cypriot,** qualified in the United Kingdom, has opportunity of appointment as Medical Officer in charge of Hospital attached to the Amiandos Mines, Cyprus. Salary not less than £2000. House and facilities provided.

For details application should be made to the Secretary of THE TUNNEL PORTLAND CEMENT CO. LTD., 105, Piccadilly, London, W.1, together with qualifications and testimonials.

**Capable Secretary Shorthand-Typist seeks post with** Consultant, W.1. Excellent experience; used to busy practice. Good driver.—Address, No. 264, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

**Educated young lady, 3 years secretarial experience** medical school, requires post as secretary.—Address, No. 263 THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

**The Proprietor of British Patent No. 695614 for "Improve**ments in Apparatus for Artificially Inducing Respiration," desires to enter into negotiations with a firm or firms for the sale of the patent or for the grant of licences thereunder.—Further particulars may be obtained from MARKS & CLERK, 57 and 58, Lincoln's Inn-fields, London, W.C.2.

**"Pregnancy Diagnosis by the Xenopus Method," 24-hour** service. Send specimen of urine and £1 1s. fee. Hematology, Biochemistry, Flame Photometry.—WELBECK BIOLOGICAL LABORATORIES, 26, Park-crescent, Portland-place, W.1 (MUSeum 5386–7).

**Applicants for posts requiring testimonials copied or** duplicated should communicate with MANTON SECRETARIAL SERVICE LTD., 98, Victoria-street, S.W.1 (Phone : VICtoria 0141), who are specialists in this kind of work.

**Typewriting and Duplicating. First-class work at moder**ate prices by experienced medical typists. Electric machines. —SYBIL RANG, 21, Heath-street, Hampstead, London, N.W.3 (HAM 5329/0504).

**Professional, technical and personal typewriting. Dupli**cating, circularising, &c., efficiently and speedily executed.—"MOWBRAY," 146, Bishopsgate, E.C.2 (BIS. 2545, BAR. 7665).

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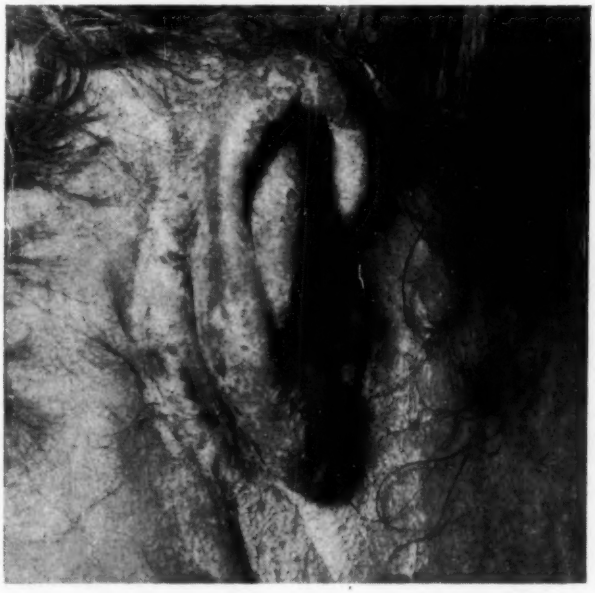

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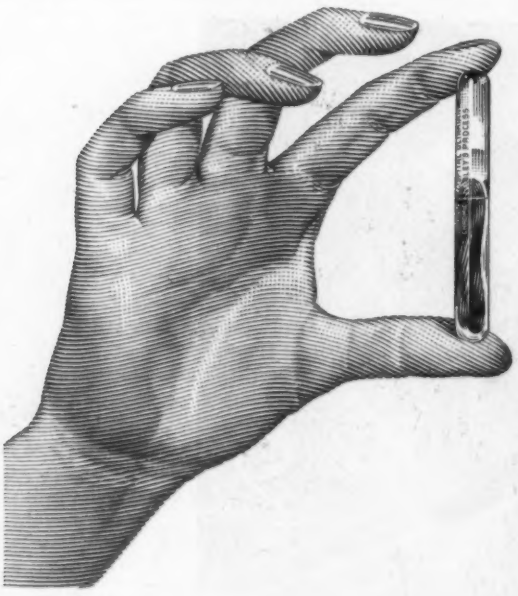

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